ORDER NO. HAD8606571C0

Service Manual

Cassette Deck

RS-B405

dbx**/Dolby B • C NR-Equipped
Stereo Cassette Deck

RS-B405

DOLBY B•C NR*

Color

(K)...Black Type
(S)...Silver Type

Color	Areas
(K)	[MC].....Canada.
(K) (S)	[EG].....F.R. Germany.
(K) (S)	[EH].....Holland.
(K) (S)	[XA].....Asia, Latin America, Middle Near East and Africa.
(K) (S)	[XL].....Australia.
(K) (S)	[XB].....Saudi Arabia.

RS-B405 MECHANISM SERIES

SPECIFICATIONS

■ CASSETTE DECK SECTION

Deck system	Stereo cassette deck
Track system	4-track, 2-channel
Heads	
REC/PLAY	Solid Permaloy head
Erasing	Double-gap ferrite head
Motors	Electronically controlled DC motor
Recording system	AC bias
Bias frequency	80 kHz
Erasing system	AC erase
Tape speed	4.8 cm/sec. (1-7/8 ips)
Frequency response	
METAL	20 Hz~18 kHz
	30 Hz~17 kHz (DIN)
	40 Hz~17 kHz (±3 dB)
CrO_2	20 Hz~17 kHz
	30 Hz~16 kHz (DIN)
	40 Hz~16 kHz (±3 dB)
NORMAL	20 Hz~16 kHz
	30 Hz~15 kHz (DIN)
	40 Hz~15 kHz (±3 dB)
Dynamic Range (with dbx in)	110 dB (1 kHz)
S/N	(signal level = max recording level, CrO_2 type tape)
Max. Input level improvement (with dbx in)	10 dB
dbx in	92 dB (A weighted)
Dolby C NR in	74 dB (CCIR)
Dolby B NR in	66 dB (CCIR)
NR out	56 dB (A weighted)
Wow and flutter	0.08% (WRMS)
	±0.2% (DIN)
Fast Forward and Rewind Time	Approx. 100 seconds with C-60 cassette tape
Input sensitivity and impedance	
MIC	0.25 mV/400 Ω~10 kΩ
LINE	60 mV/47 kΩ
Output voltage and impedance	
LINE	400 mV/2.2 kΩ
HEADPHONES	80 mV/8 Ω

■ GENERAL

Power consumption	17W
Power supply	
For Canada	AC 60 Hz, 120V
For continental Europe	AC 50 Hz/60 Hz, 220V
For other	AC 50 Hz/60 Hz, 110V/127V/220V/240V
Dimensions (W×H×D)	430 × 102 × 237 mm (16-15/16″×3-31/32″×9-13/32″)
Weight	3.5 kg (7.5 lb.)

Note:
Specifications are subject to change without notice.
Weight and dimensions are approximate.

* Dolby noise reduction manufactured under license from Dolby Laboratories Licensing Corporation.
"Dolby" and the double-D symbol are trade marks of Dolby Laboratories Licensing Corporation.

** The term dbx is a registered trademark of dbx Inc.

Technics

Matsushita Electric of Canada Limited
5770 Ambler Drive, Mississauga, Ontario, L4W2T3

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

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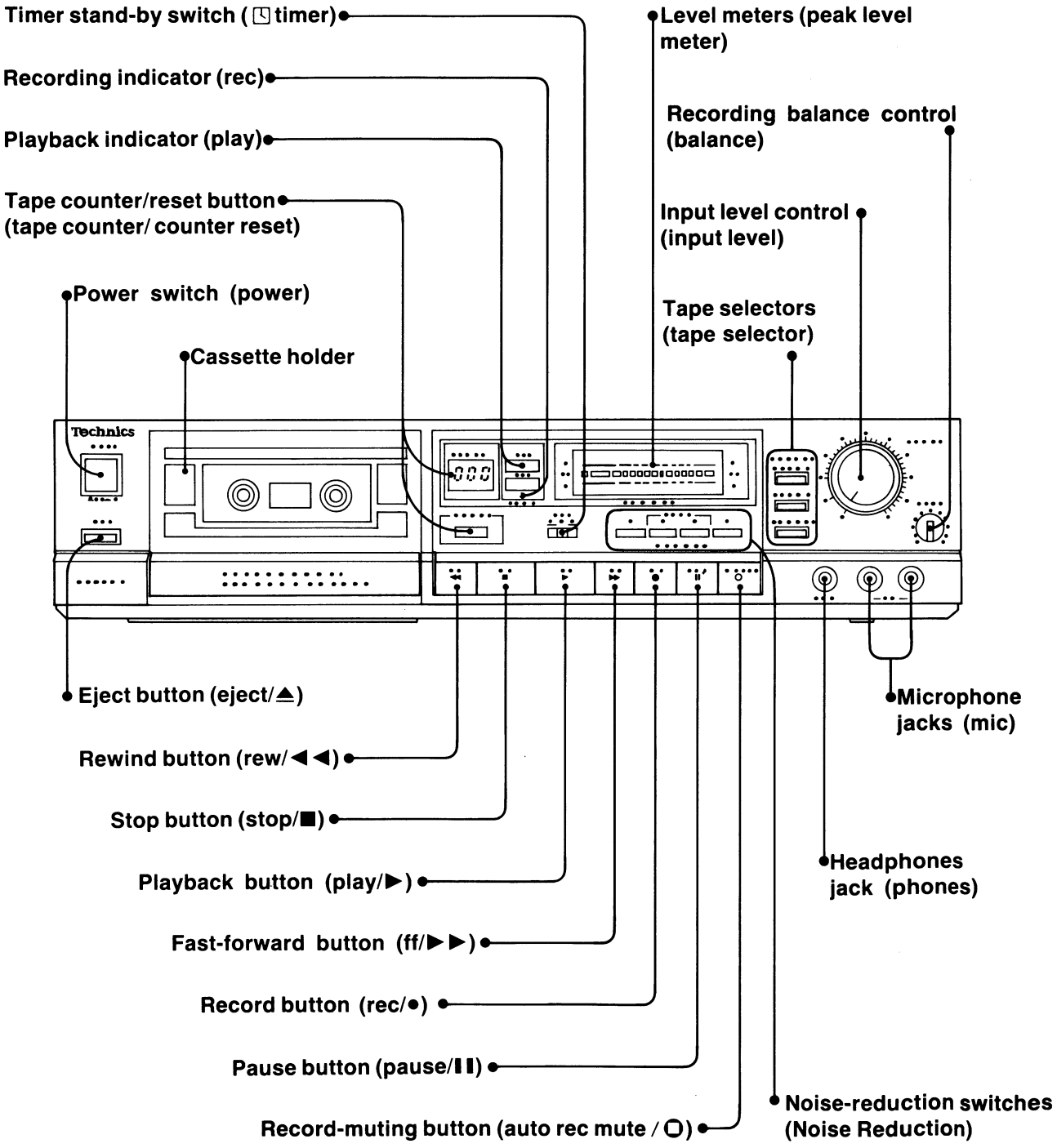
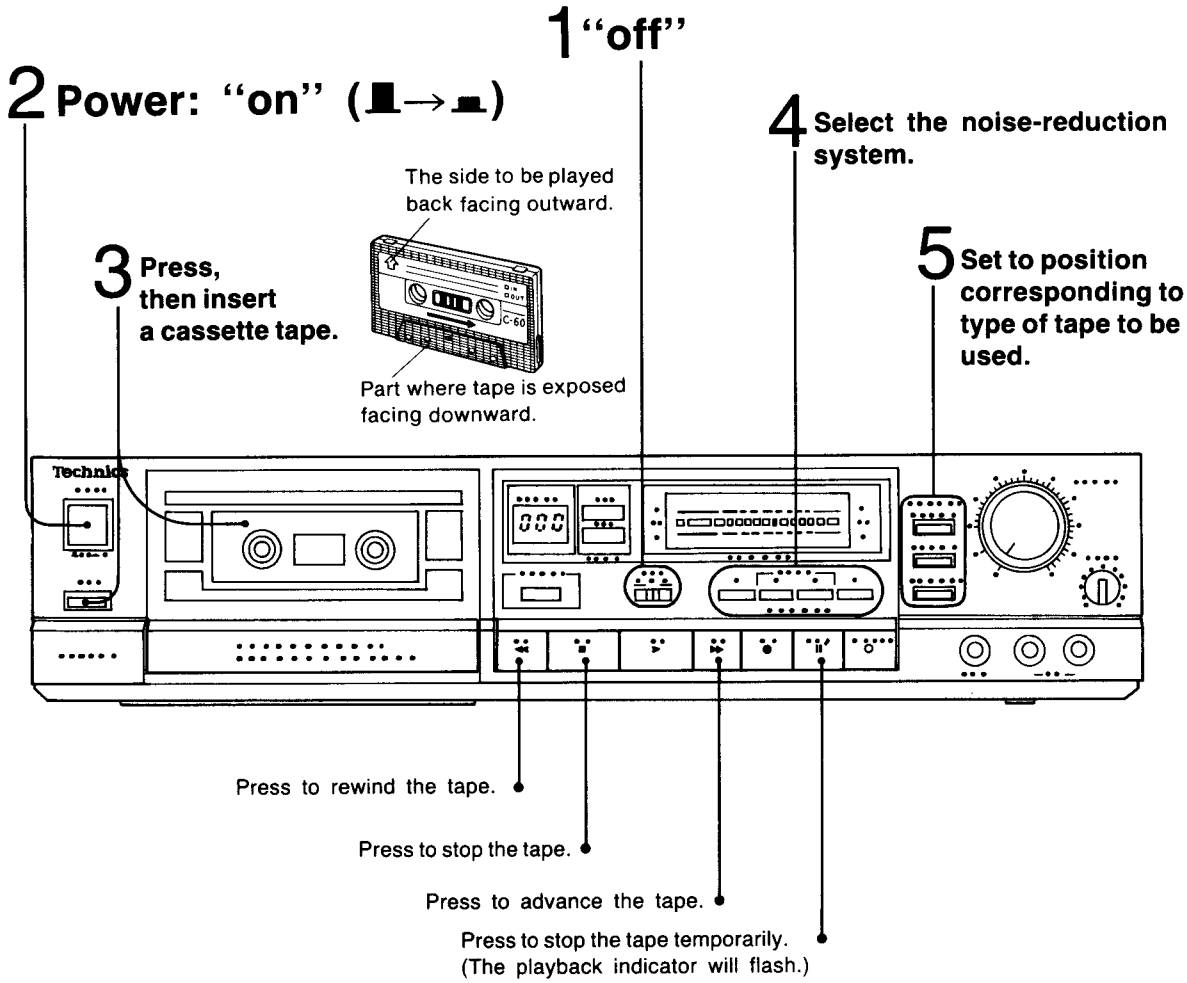
■ LOCATION OF CONTROLS



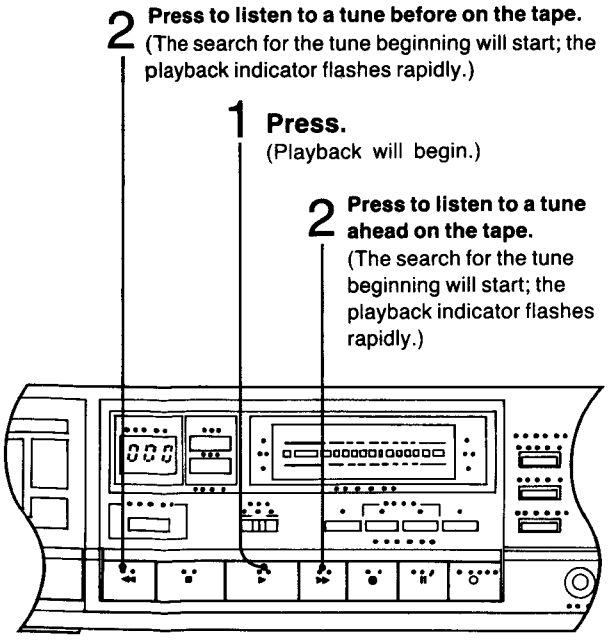
■ OPERATION

Standard Operating Procedures


1 "off"
2 Power: "on" (■→▬)
3 Press, then insert a cassette tape.
4 Select the noise-reduction system.
5 Set to position corresponding to type of tape to be used.
The side to be played back facing outward.
Part where tape is exposed facing downward.
Press to rewind the tape.
Press to stop the tape.
Press to advance the tape.
Press to stop the tape temporarily. (The playback indicator will flash.)

Auto music select

This feature is used to locate the beginning of the current of following song.


2 Press to listen to a tune before on the tape. (The search for the tune beginning will start; the playback indicator flashes rapidly.)
1 Press. (Playback will begin.)
2 Press to listen to a tune ahead on the tape. (The search for the tune beginning will start; the playback indicator flashes rapidly.)

Notes:

The following describes those instances in which the tape that is fast-forwarded or rewound does not stop at the beginning, or stops in the middle, of a song:

- When the music is very soft, e.g., classical music which is mainly pianissimo
- When there is sustained silence of 4 seconds or more within the recording (e.g., of a conversation or a lecture)
- When the interval between songs is very short or contains audible noise
- Tapes recorded by using fade-in or fade-out techniques.

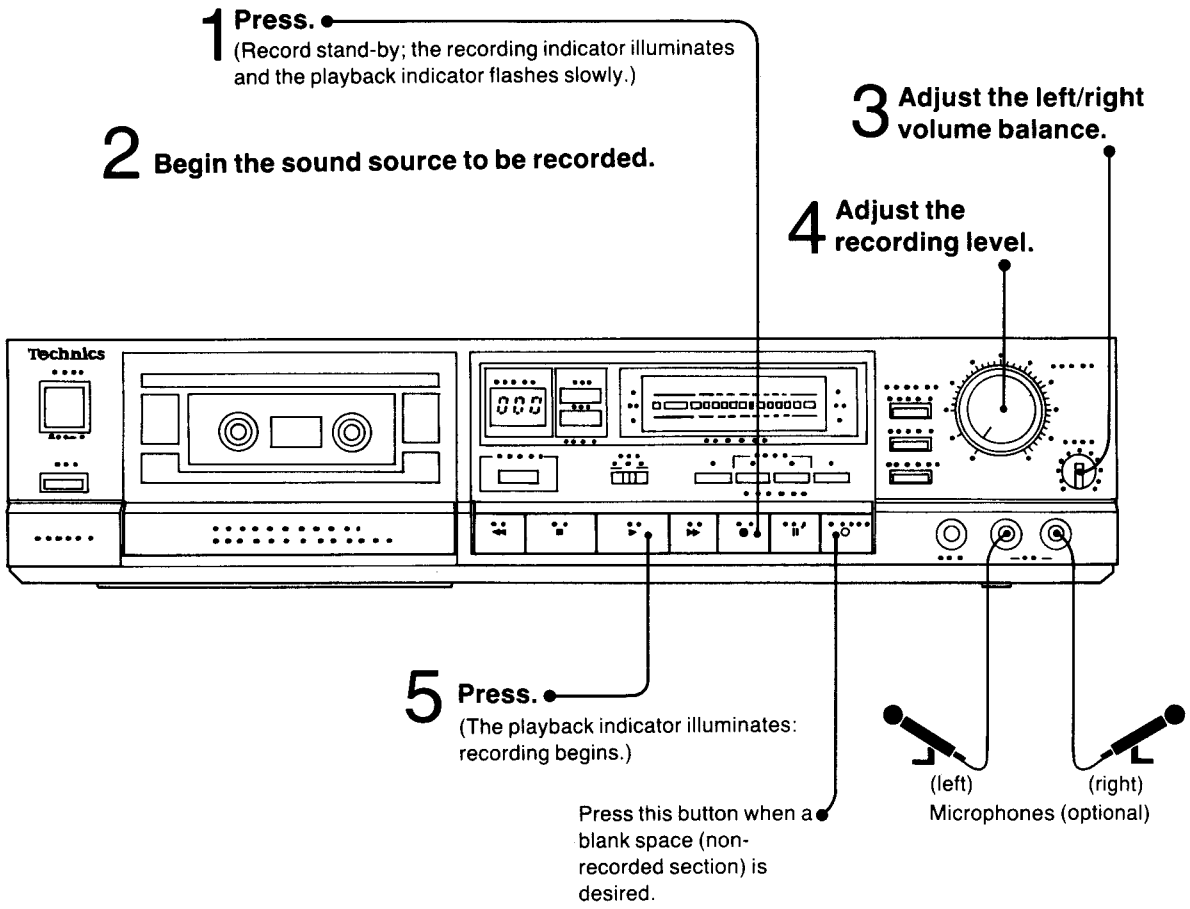
•Fade-in and fade-out

To start a recording with the volume level at minimum ("0" and gradually increase to the ordinary recording level is called the "fade-in" technique. Conversely, to end a recording by gradually reducing the volume level to minimum is called the "fade-out technique.

Music select system manufactured under license of Starr. S.A., Bruxelles, Belguim.

Recording

Have you completed the "Standard Operating Procedures" (page 3) ?


1 Press.
(Record stand-by; the recording indicator illuminates and the playback indicator flashes slowly.)
2 Begin the sound source to be recorded.
3 Adjust the left/right volume balance.
4 Adjust the recording level.
Technics
5 Press.
(The playback indicator illuminates: recording begins.)
Press this button when a blank space (non-recorded section) is desired.
(left)
(right)
Microphones (optional)

Adjustment of the recording level

The numbers which you should use as a guide for the adjustment of the tape level will differ depending upon the type of tape used.

Noise Reduction (NR)	Normal Tape CrO_2 Tape	Metal Tape
dbx	+8 dB	+12 dB
Dolby NR B•C NR out	+6 dB	+8 dB

•Make the adjustment so that the maximum level indicated in the table illuminated.

To erase recorded sounds

Note that any sounds on the tape will be automatically erased if a new recording is made on that part of the tape.

1 **Press the noise-reduction select button marked "out".**

2 **Set the input level control to the minimum (0) position.**

3 **Prepare in the same way as for recording, and then let the tape run.**

■ DISASSEMBLY INSTRUCTIONS

Ref. No. 1	How to remove the cabinet
Procedure 1	• Remove the 4 screws and remove the cabinet.

Ref. No. 2	How to remove the mechanism unit
Procedure 1 → 2	• Remove the 2 screws (❶, ❷). • Push the eject button.

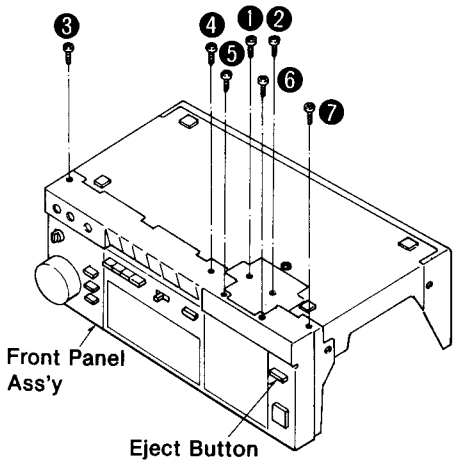


Fig. 1

• Remove the 3 screws (❶~❸).

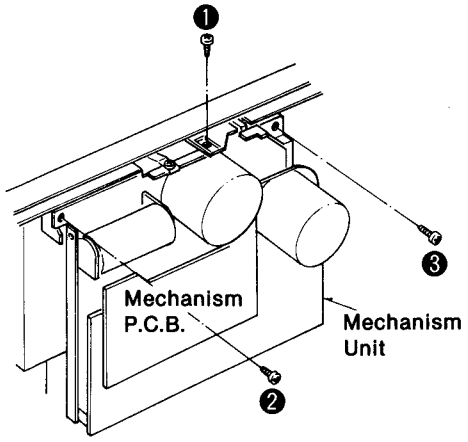


Fig. 2

Ref. No. 3	How to remove the main P.C.B.
Procedure 1 → 3	• Remove the 5 screws (❶~❺). • Open the sides of back chassis, and then pull down it.

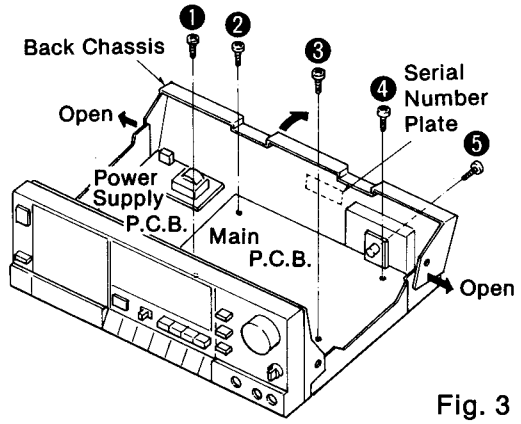


Fig. 3

Ref. No. 4	How to remove the VR/SW P.C.B. and FL meter P.C.B.
Procedure 1 → 4	• Remove the 2 screws (❶~❷). • Push the 2 tabs, and then remove the FL meter P.C.B. • Remove the 3 screws (❸~❺). • Pull out the volume knob, and then remove the VR/SW P.C.B.

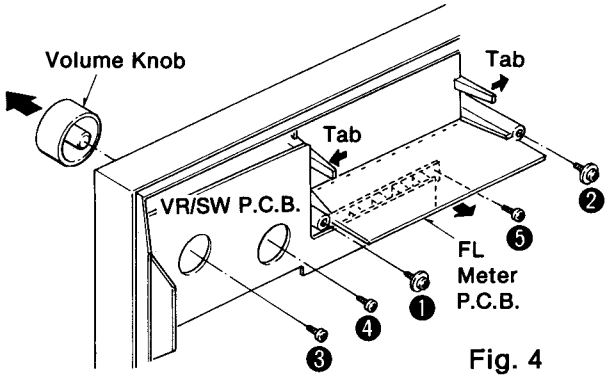


Fig. 4

Ref. No. 5	How to remove the LED/operation SW P.C.B.
Procedure 1 → 3 → 4 → 5	• Remove the 4 screws (❶~❹). • Push the tab.

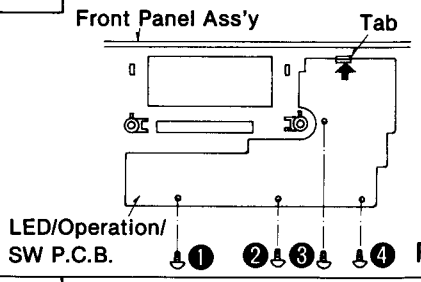


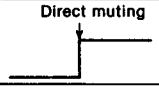
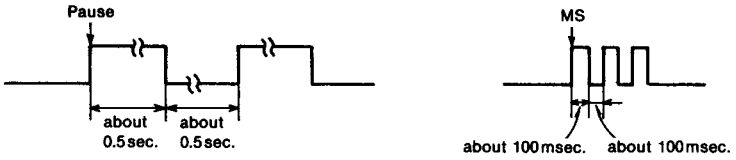
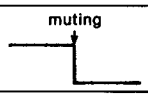
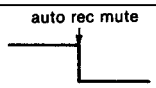
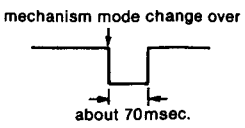
Fig. 5

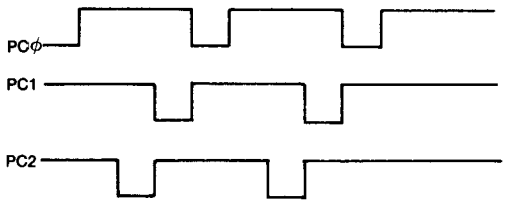
Ref. No. 6	How to remove the front panel
Procedure 1→3→4→5→6	• Remove the 5 screws (❸~❼). (See Fig. 1)

*** Serial No. Indication**

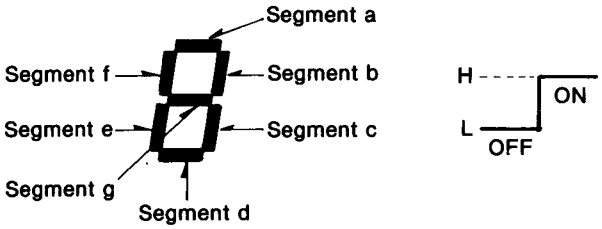
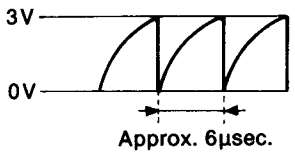
• The serial number plate of this product is attached to the back chassis (shown in Fig. 3).

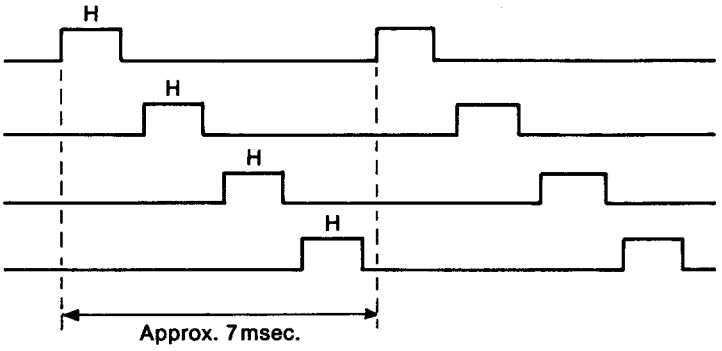
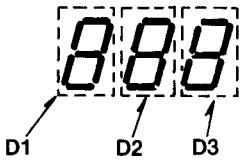
■ MICROCOMPUTER TERMINAL FUNCTION AND WAVEFORM (IC901: LM6416E-1984) * This microcomputer is used for mechanical operation.

Terminal No.	Symbol	Function/operation
1.	PDϕ	REC LED • "L" in rec mode, light up in rec mode. • Light up in immediately after timer rec command given.
2.	PD1	Bias control • "L" in rec mode only.
3.	PD2	Music select function detection • In power on mode, music select function is detected. • "L" in music select function "off", "H" in music select function "on".
4.	PD3	Power off detection • In power off mode, "H" in direct muting mode. 
5. 6.	Extal Xtal	Clock oscillation • Clock oscillation of about 400kHz
7.	INT	Reel table rotation detection • Rotation of reel table is detected by photo senser for the detection of tape end.
8.	RES	Reset terminal • Used to reset the microcomputer when power is thrown in.
9.	PEϕ	PLAY LED • Light up in play mode. • In pause mode, LED is lit up or down at intervals of about 0.5sec. • In music select mode, LED is lit up or down at intervals of about 100msec. 
10.	PE1	Plunger drive • PE1 terminal serves to retain the attraction of plunger to keep the state of Cue/Review during music select mode.
11.	PE2	Direct muting output • "L" in muting mode. 
12.	PE3	Auto rec mute output • In rec mode only, "L" in auto rec mute mode. 
13. 14.	TEST V_{ss}	• Connection to GND
15.	PFϕ	Capstan motor drive • "H" when power is thrown in. • When mechanism mode is changed over, the level goes "L".
16.	PF1	FF/REW motor control • "H" in rew mode.
17.	PF2	FF/REW motor control • "H" in FF/Play mode.
18.	PF3	FF/REW motor torque control • "L" in play mode.
19.	PGϕ	Plunger drive • The level goes "L" for about 70msec. when the mechanism mode is changed (when shifting the head angle.) 
20.	V_{DD}	Power supply • Operative on about 5.6 volts.
21.	PAϕ	Input switch stage reading • Input of rec inh. switch (S901) and FF switch (S704). • The above-mentioned inputs are read in accordance with PCϕ and PC2.
22.	PA1	Input switch stage reading. • Input of mechanism play switch (S902), play switch (S703) and auto rec mute switch (S707). • The above-mentioned inputs are read in accordance with PCϕ~PC2.

Terminal No.	Symbol	Function/operation
23.	PA2	Input switch stage reading • Input of timer play switch (S708), stop (S702) and rec switch (S705). • The above-mentioned inputs are read in accordance with PCϕ~PC2.
24.	PA3	Input switch stage reading • Input of timer rec switch (S708), rew switch (S701) and pause switch (S706). • The above mentioned inputs are read in accordance with PCϕ~PC2.
25. 26. 27.	PCϕ PC1 PC2	Input switch scanning 
28.	PC3	• Non connection.

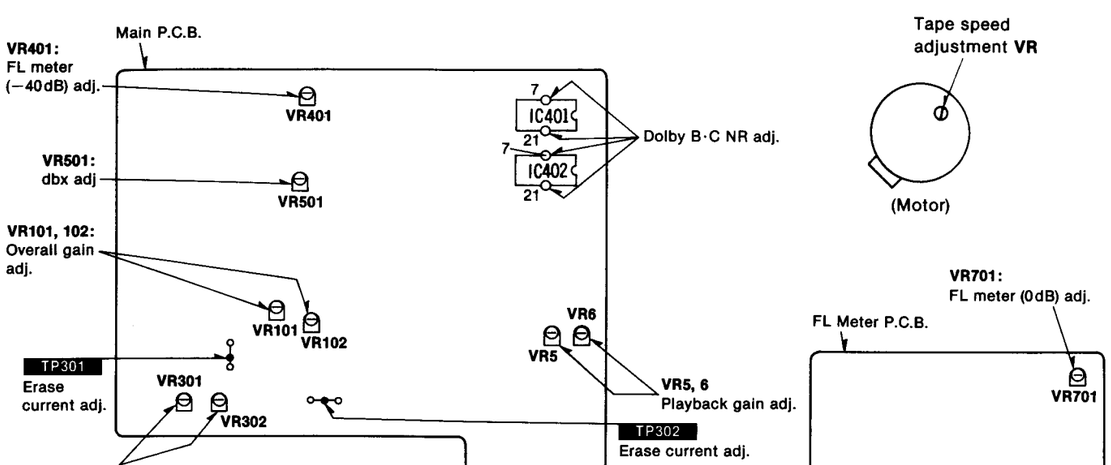
(IC702: LM6417E-589) * This microcomputer is used for tape counter operation.

Terminal No.	Symbol	Name	Function/operation
1.	PD ϕ	Counter Segment a	**Number indication** 
2.	PD 1	Counter Segment b	
3.	PD 2	Counter Segment c	
4.	PD 3	Counter Segment d	
5.	OSC	Oscillation Terminal	• Clock oscillation of about 200kHz.  Note) Do not connect anything to this terminal during other measurement because it will be otherwise affected by the probe.
6.	PE ϕ	Counter Segment e	• Refer to PD ϕ~PD 3.
7.	PE 1	Counter Segment f	
8.	PE 2	Counter Segment g	
9.	PE 3	———	• Non connection.
10.	TEST	TEST	• Connection to GND.
11.	Vss	———	• Connection to GND.
12.	INT	———	• Non connection.
13.	RST	Reset Terminal	• Used to reset the microcomputer when power is thrown in. • Reset at "L" level (0.3 V_{DD} or less).
14.	V_{DD}	Power Supply Terminal	• Operative on approx. 5.0 volts.
15.	PA ϕ	Up/Down Command	• Selection of delay time for operation mode. • When diode (D252) is used, play time is zero.

Terminal No.	Symbol	Name	Function/operation
16.	PA 1	Counter Reset Input	• In "L" level, counter indication is reset to 000
17.	PA 2	Counter Up/Down Input	• Up counting with "H" level. • Down counting with "L" level.
18.	PA 3	Reel Table Pulse	• The rotation of reel table is detected by photo senser, and the pulses are used to carry up or down for the counter. • With the takeup reel table rotated twice, the count number changes.
19.	PCϕ	Input Scan only	 
20.	PC 1	Counter D1 & Input Scan	
21.	PC 2	Counter D2 & Input Scan	
22.	PC 3	Counter D3 & Input Scan	

■ MEASUREMENT AND ADJUSTMENT METHODES

• Adjustment Point



Measurement Condition

- Input level controls; Maximum
- Balance controls; Center
- Tape select switch; Normal
- Dolby NR switch; Out
- Timer start switch; Off
- Make sure heads are clean
- Make sure capstan and pressure roller are clean.
- Judgeable room temperature 20±5°C (68±9°F)

Measuring instrument

- EVM (Electronic Voltmeter)
- Oscilloscope
- Digital frequency counter
- AF oscillator
- ATT (Attenuator)
- DC voltmeter
- Resistor (600Ω)

Test tape

- Head azimuth adjustment (8kHz, −20dB); QZZCFM
- Tape speed adjustment (3kHz, −10dB); QZZCWAT
- Playback frequency responce (315Hz, 12.5kHz, 10kHz, 8kHz, 4kHz, 1kHz, 250Hz, 125Hz, 63Hz, −20dB); QZZCFM
- Playback gain adjustment (315Hz, 0dB); QZZCFM
- Overall frequency response, Overall gain adjustment
  - Normal reference blank tape; QZZCRA
  - CrO_2 reference blank tape; QZZCRX
  - Metal reference blank tape; QZZCRZ

Head azimuth adjustment

1. Test equipment connection is shown in Fig. 1.
2. Playback the azimuth adjusted part (8kHz, −20dB) of the test tape (QZZCFM) and regulate the angle adjusting screw so that the outputs of L-CH and R-CH are maximized. (When the adjusting positions are different with L-CH and R-CH, find a position where the outputs of L-CH and R-CH are balanced, and then make the adjustment.)
3. At the same time, obtain a lissajous waveform and eliminate phase deflection.
4. After adjustment, lock the tape guide height and angle adjustment screws.

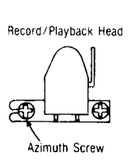


Fig. 2

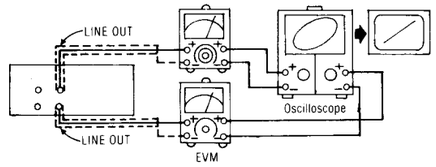


Fig. 1

Tape speed adjustment

1. Test equipment connection is shown in Fig. 3.
2. Playback the middle part of the test tape (QZZCWAT).
3. Adjust the VR in the motor so that the output is within the standard.

Standard value: 3000±20Hz

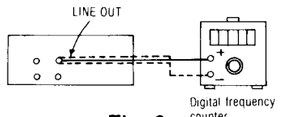


Fig. 3

Playback frequency response

1. Test equipment connection is shown in Fig. 4.
2. Playback the playback frequency response part (315Hz, 12.5kHz~63Hz, −20dB) of the test tape (QZZCFM).
3. Check that the frequency is within the range shown in Fig. 5 for both L-CH and R-CH.

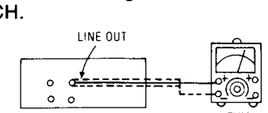


Fig. 4

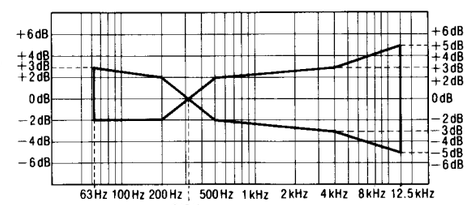


Fig. 5

Playback gain adjustment

1. Test equipment connection is shown in Fig. 4.
2. Playback the playback gain adjusted part (315Hz, 0dB) of the test tape (QZZCFM).
3. Adjust VR5, (L-CH) {VR6 (R-CH)} so that the output is within the standard.

Standard value: 0.4±0.5dB (0.02V)

Erase current adjustment

1. Test equipment connection is shown in Fig. 6.
2. Set the tape selector switch to the metal position.
3. Insert the metal tape.
4. Press the record and pause buttons.
5. At this time make sure that the output between TP301 and the ground is within the standard.
6. Cut off TP302 if the value is smaller than 240mA.

Standard value: 210±30mA (Metal) (210±30mV)

Erase current (A) = $\frac{\text{Voltage across resistor R301}}{1\,(\Omega)}$

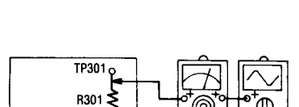


Fig. 6

Overall frequency response

1. Test equipment connection is shown in Fig. 7.
2. Set the tape selector switch to the normal position.
3. Set a normal blank tape (QZZCRA) and record by applying signal (50Hz, 100Hz, 200Hz, 500Hz, 1kHz, 4kHz, 8kHz, 10kHz and 12.5kHz), 20dB attenuated from the reference input level signal (1kHz, −24dB).
4. Playback the signal recorded in step 3, and check that the level of each output frequency is within the range shown in Fig. 8 in comparison with the reference frequency (1kHz).
5. If it is not within the standard range, adjust the bias current by VR301 (L-CH) {VR302 (R-CH)} so that the frequency level is within the standard.
   - Level up in high frequency range.....Increase the bias current.
   - Level down in high frequency range.....Decrease the bias current.
6. After that increase the signal recorded on CrO_2 blank tape (QZZCRX) and metal blank tape (QZZCRZ) up to 14kHz and adjust in the same way as mentioned above and check that the frequency level is within the range shown in Fig. 9.

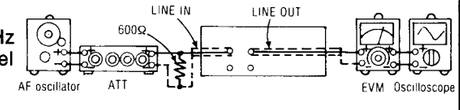


Fig. 7

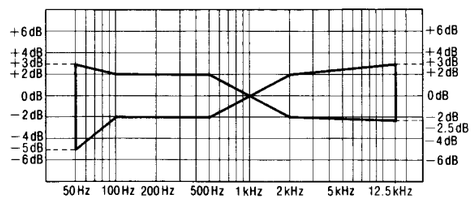


Fig. 8

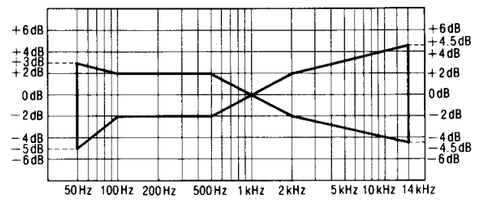


Fig. 9

Tape speed
adjustment **VR**

Motor)

VR701:
FL meter (0dB) adj.

C.B.

VR701

er are clean.
C (68±9°F)

dB); QZZCFM
gain adjustment
RA
X
Z

Oscilloscope

Digital frequency
counter

3

Playback frequency response

1. Test equipment connection is shown in Fig. 4.
2. Playback the playback frequency response part (315Hz, 12.5kHz~63Hz, −20dB) of the test tape (QZZCFM).
3. Check that the frequency is within the range shown in Fig. 5 for both L-CH and R-CH.

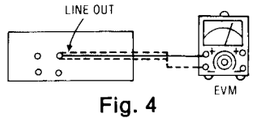


Fig. 4

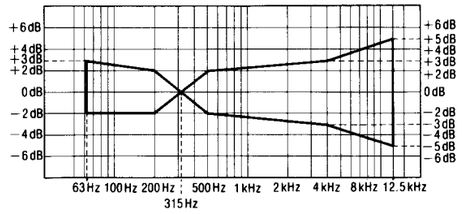


Fig. 5

Playback gain adjustment

1. Test equipment connection is shown in Fig. 4.
2. Playback the playback gain adjusted part (315Hz, 0dB) of the test tape (QZZCFM).
3. Adjust VR5, (L-CH) {VR6 (R-CH)} so that the output is within the standard.

Standard value: 0.4±0.5dB (0.02V)

Erase current adjustment

1. Test equipment connection is shown in Fig. 6.
2. Set the tape selector switch to the metal position.
3. Insert the metal tape.
4. Press the record and pause buttons.
5. At this time make sure that the output between TP301 and the ground is within the standard.
6. Cut off TP302 if the value is smaller than 240mA.

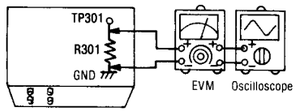


Fig. 6

Standard value: 210±30mA (Metal) (210±30mV)

$$\text{Erase current (A)} = \frac{\text{Voltage across resistor R301}}{1\,(\Omega)}$$

Overall frequency response

1. Test equipment connection is shown in Fig. 7.
2. Set the tape selector switch to the normal position.
3. Set a normal blank tape (QZZCRA) and record by applying signal (50Hz, 100Hz, 200Hz, 500Hz, 1kHz, 4kHz, 8kHz, 10kHz and 12.5kHz), 20dB attenuated from the reference input level signal (1kHz, −24dB).
4. Playback the signal recorded in step 3, and check that the level of each output frequency is within the range shown in Fig. 8 in comparison with the reference frequency (1kHz).

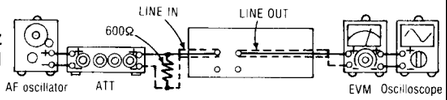


Fig. 7

5. If it is not within the standard range, adjust the bias current by VR301 (L-CH) {VR302 (R-CH)} so that the frequency level is within the standard.
   - Level up in high frequency range.....Increase the bias current.
   - Level down in high frequency range.....Decrease the bias current.
6. After that increase the signal recorded on CrO_2 blank tape (QZZCRX) and metal blank tape (QZZCRZ) up to 14kHz and adjust in the same way as mentioned above and check that the frequency level is within the range shown in Fig. 9.

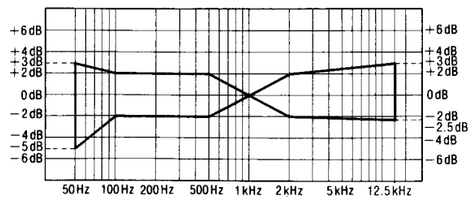


Fig. 8

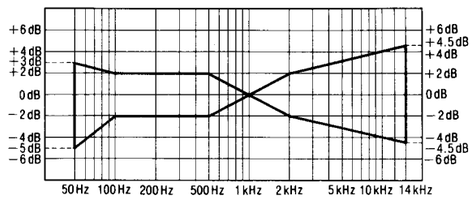


Fig. 9

Overall gain adjustment

1. Test equipment connection is shown in Fig. 7.
2. Set the tape selector switch to the normal position.
3. Set a normal blank tape (QZZCRA) and apply the reference input level signal (1kHz, −24dB) in record pause mode.
4. Adjust the output 0.42V by attenuator and then record.
5. Playback the signal recorded in step 3, and check that the output is within the standard.
6. If it is not within the standard, adjust VR101 (L-CH) {VR102 (R-CH)} and repeat the step (2), (3) and (4) until the output is within the standard.

Standard value: 0.4V±0.05V

Fluorescent meter adjustment

1. Test equipment connection is shown in Fig. 7.
2. Set a normal blank tape (QZZCRA) and apply the reference input level signal (1kHz, −24dB) in record pause mode.
3. Adjust the output to 0.4V by attenuator.
   — −40dB adjustment —
4. Apply level signal 40dB attenuated from the input of step 2.
5. Adjust VR401 so that the −40dB segment part is half lighted. (See Fig. 10.)
   — 0dB adjustment —
6. Adjust VR701 so that the 0dB segment part is half lighted when the input of step 2 is applied. (See Fig. 11.)
7. Repeat the above steps (2), (3), (4), (5) and (6) and check that both −40dB and 0dB segment parts are half lighted.

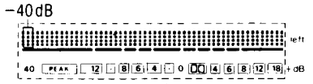


Fig. 10

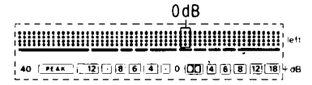


Fig. 11

Dolby NR circuit

1. Test equipment connection is shown in Fig. 12.
2. Set a normal tape and apply 1kHz signal in record pause mode.
3. Adjust by attenuator so that the output between terminal 7 of IC401 (L-CH) {IC402 (R-CH)} and ground is 12.3mV.

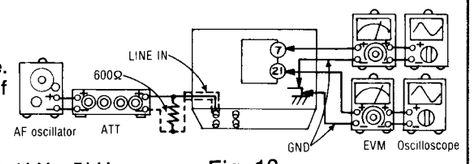


Fig. 12

— Dolby B (Encode characteristic) —

4. Set NR switch to "Dolby B" and change the input signal to 1kHz, 5kHz.
5. Check that the output between terminal 21 of IC401 (L-CH) {IC402 (R-CH)} and ground change as specified from the level in NR out mode.

Standard value: 6±2.5dB (1kHz), 8±2.5dB (5kHz)

— Dolby C (Encode characteristic) —

6. Set NR switch to "Dolby C" and change the input signal to 1kHz, 5kHz.
7. Check that the output between terminal 21 of IC401 (L-CH) {IC402 (R-CH)} and ground change as specified from the level in NR out mode.

Standard value: 11.5±2.5dB (1kHz), 8.5±2.5dB (5kHz)

dbx attack recovery time adjustment

1. Test equipment connection is shown in Fig. 13.
2. Set a normal tape and NR switch to "dbx".
3. Apply 1kHz, −27dB signal in record pause mode.
4. Adjust by attenuator so that the output between C541 (L-CH) {C542 (R-CH)} and ground is 300mV.
5. Adjust VR501 that the DC voltmeter reading is within the reference.

Reference value: 15±0.5mV

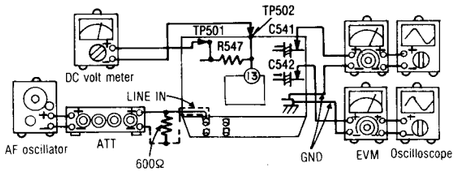
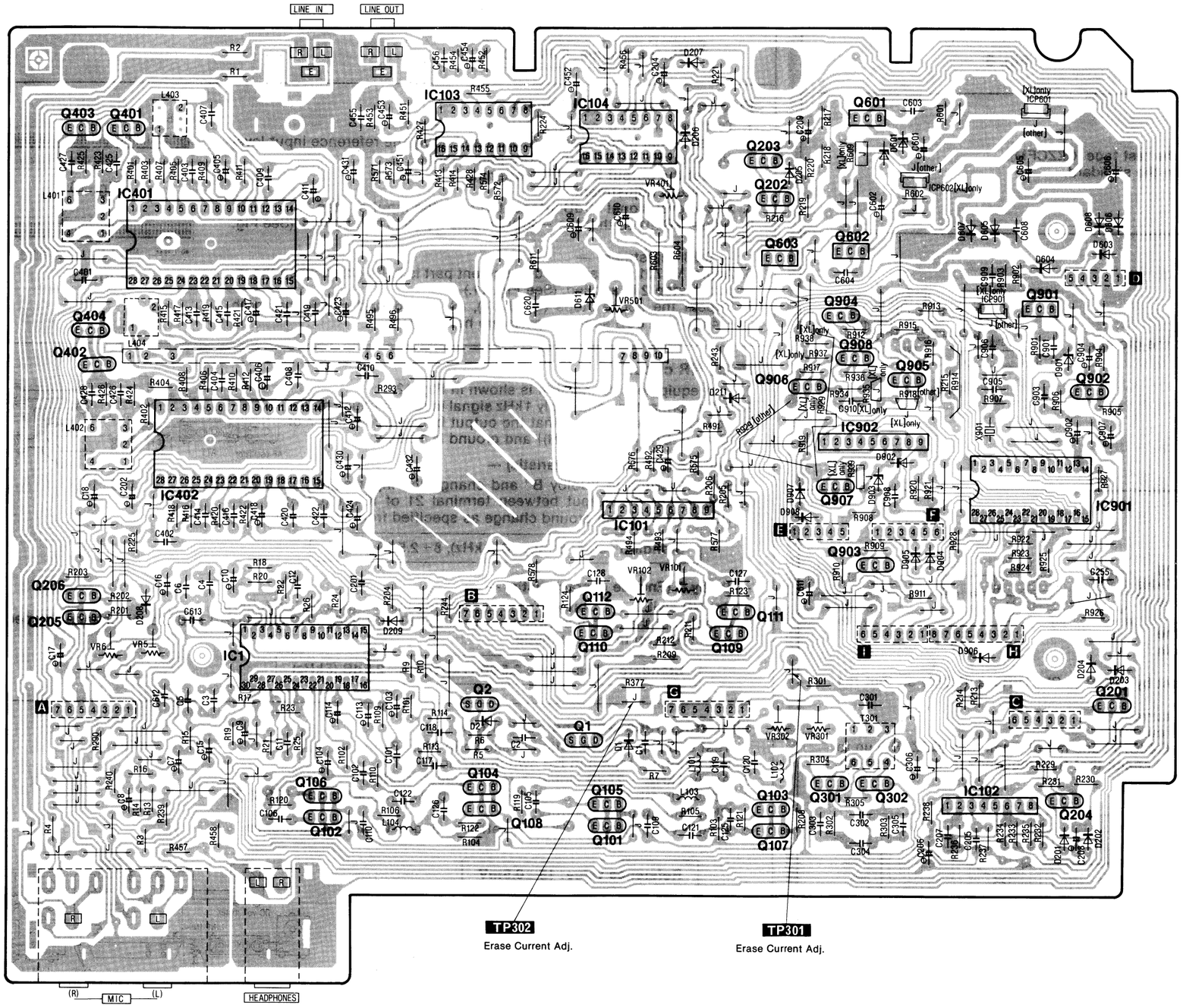


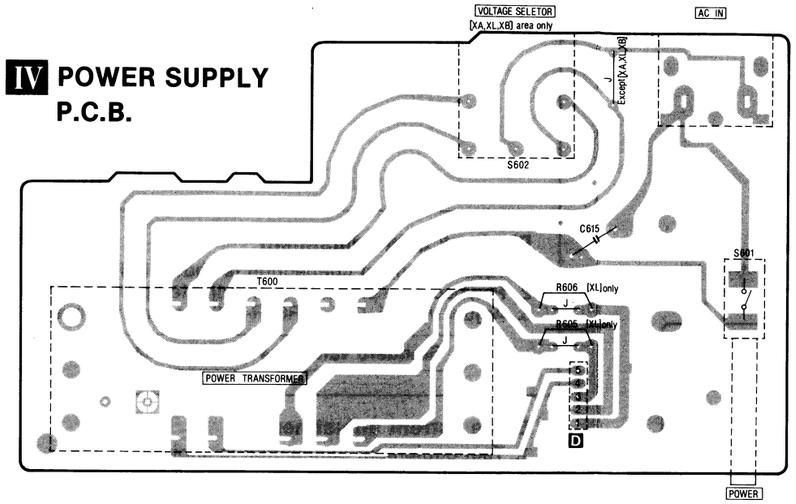
Fig. 13

■ PRINTED CIRCUIT BOARDS

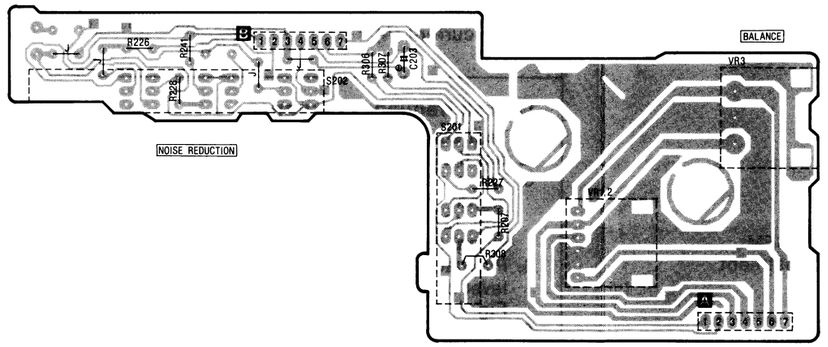
I MAIN P.C.B.



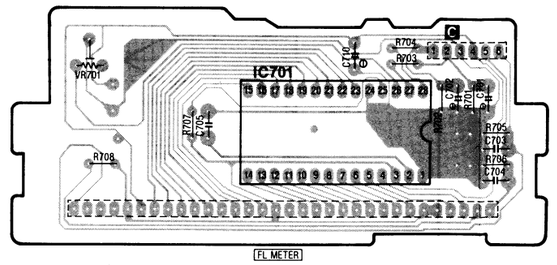
IV POWER SUPPLY P.C.B.

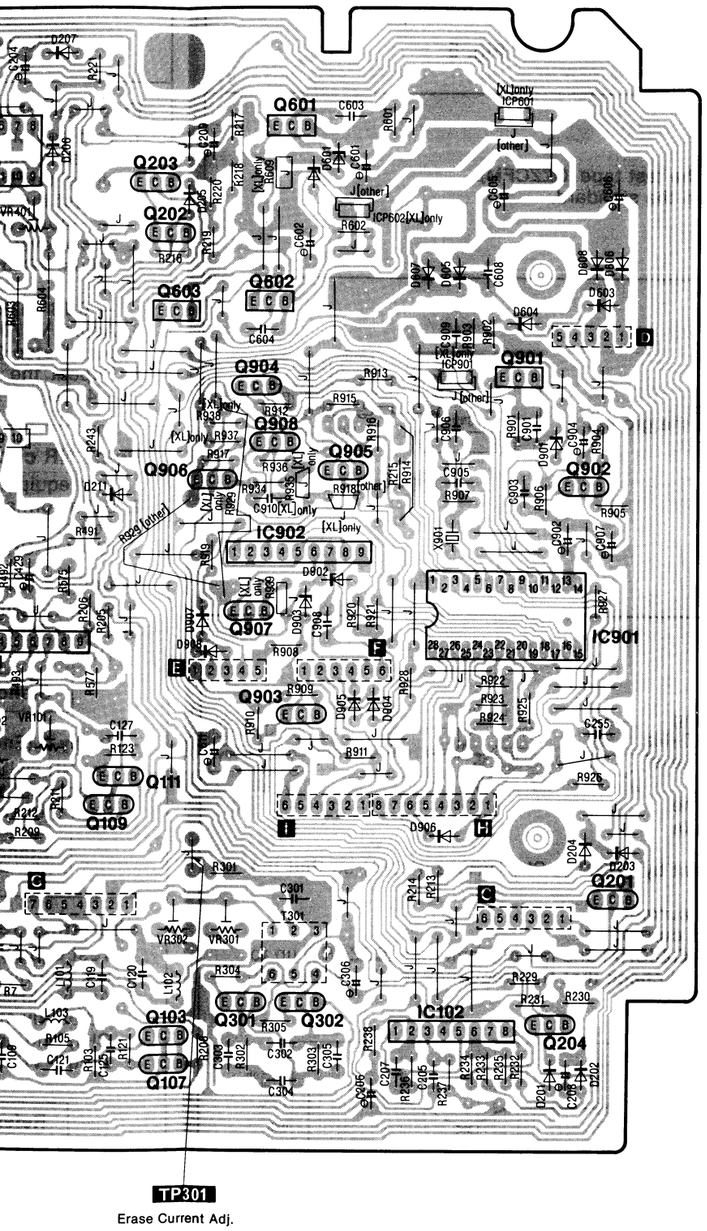


II VR/SW P.C.B.



VI FL METER P.C.B.




Q601
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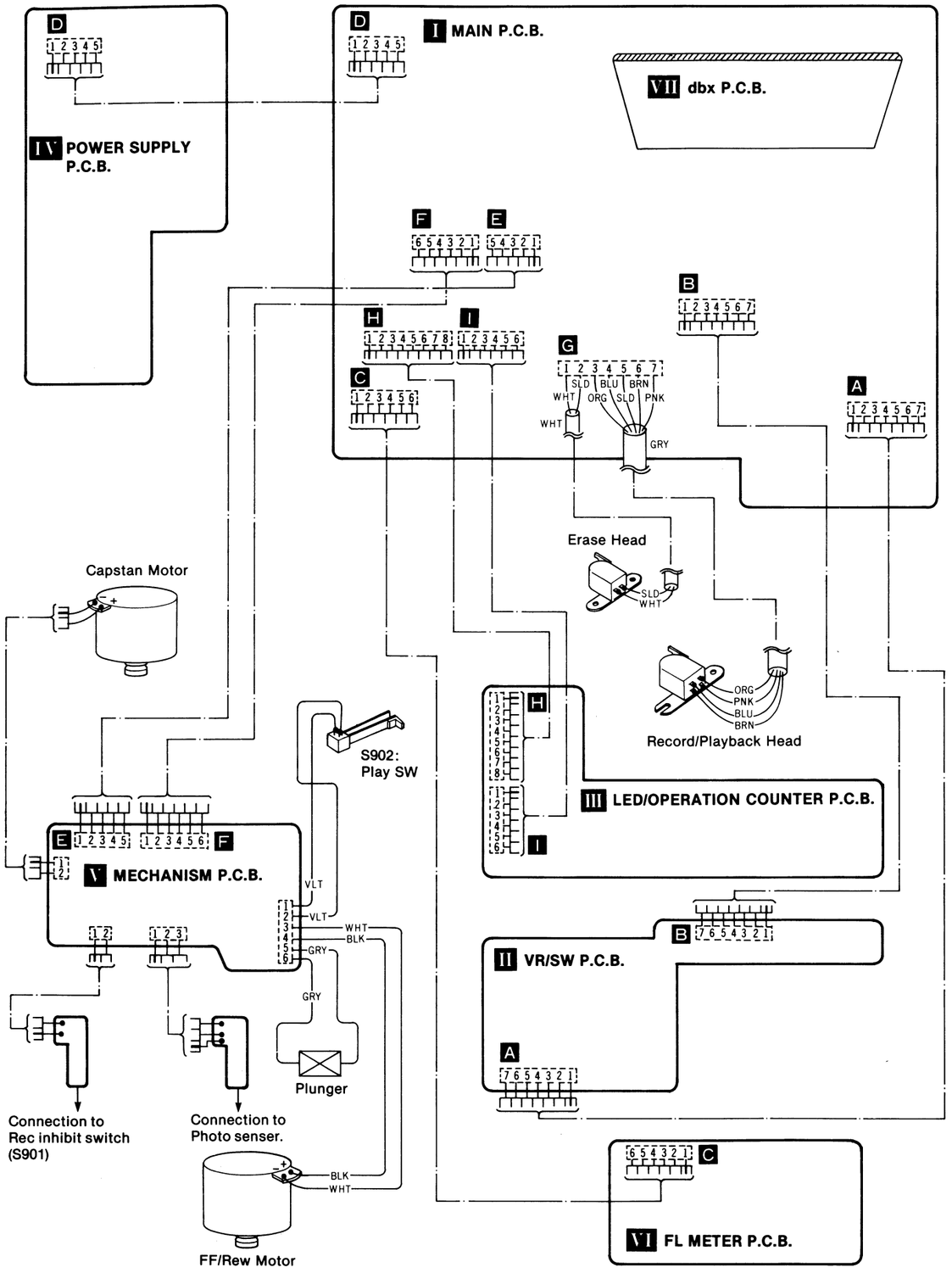
C167

■ WIRING CONNECTION DIAGRAM



■ RESISTORS AND CAPACITORS

Notes:
- Part numbers are indicated on most mechanical parts. Please use this part number for parts order.
- The unit of resistance is Ω (ohm). K=1000Ω, M=1000kΩ
- The unit of capacitance is μF (microfarad). P=10⁻⁶μF.
- Bracketed indications in Ref. columns specify the area. Parts without these indications can be used for all area.

Resistor Type		Wattage		Tolerance	
ERD	: Carbon	10	: 1/8W	G	: ±2%
ERO	: Film	12	: 1/2W	J	: ±5%
ERG	: Metal Oxide	25	: 1/4W		
ERC	: Solid	1	: 1W		
		2	: 2W		
		S1	: 1/2W		
		S2	: 1/4W		

ERD10TLJ□□□ → Chip type carbon
ERO10MKG□□□ → Chip type metal film

Capacitor Type		Voltage				Tolerance	
		ECEA Type		Other			
ECEA	: Electrolytic	0J	: 6.3V	1H	: 50V	C	: ±0.25pF
ECCD	: Ceramic	1A	: 10V	2H	: 500V	J	: ±5%
ECKD	: Ceramic	1C	: 16V	1	: 100V	K	: +10%
ECQM	: Polyester	1E	: 25V	KC	: 400V	Z	: +80%, −20%
ECQP	: Polyester	1H	: 50V			Y	: ±22%
ECET	: Electrolytic	1J	: 63V				
ECEA...N	: Non-polar Electrolytic	1V	: 35V				
		25	: 25V				
		56	: 56V				

• RESISTORS

Ref. No.	Part No.	Value	Ref. No.	Part No.	Value	Ref. No.	Part No.	Value	Ref. No.	Part No.	Value
R1, 2	ERDS2TJ223	22k	R233	ERDS2TJ393	39k	R493, 494	ERDS2TJ123	12k	R611	ERDS2TJ101	100
R3, 4	ERDS2TJ472	4.7k	R234	ERDS2TJ393	39k	R495, 496	ERDS2TJ153	15k	R701, 702	ERDS2TJ104	100k
R5, 6	ERDS2TJ155	1.5M	R235	ERDS2TJ103	10k	R502	ERD25TJ123	12k	R703, 704	ERDS2TJ102	1k
R7, 8	ERDS2TJ101	100	R236	ERDS2TJ563	56k	R503, 504	ERD25FJ102	1k	R705, 706	ERDS2TJ181	180
R9, 10	ERDS2TJ101	100	R237	ERDS2TJ102	1k	R505, 506	ERD25TJ104	100k	R707	ERDS2TJ181	180
R13, 14	ERDS2TJ473	47k				R507, 508	ERD25TJ104	100k	R708	ERDS2TJ103	10k
R15, 16	ERDS2TJ102	1k	R238	ERDS2TJ101	100	R510	ERD25FJ103	10k			
R17, 18	ERDS2TJ820	82	R239, 240	ERDS2TJ223	22k	R511, 512	ERD25TJ563	56k	R901	ERDS2TJ102	1k
R19, 20	ERDS2TJ102	1k	R241	ERDS2TJ473	47k	R513, 514	ERD25TJ223	22k	R902	ERDS2TJ182	1.8k
R21, 22	ERDS2TJ153	15k	R243	ERDS2TJ103	10k	R515, 516	ERD25FJ332	3.3k	R903	ERDS2TJ103	10k
			R244	ERDS2TJ183	18k				R904	ERDS2TJ471	470
R23, 24	ERDS2TJ564	560k	R251, 252	ERDS2TJ822	8.2k	R517, 518	ERD25TJ563	56k	R905, 906	ERDS2TJ103	10k
R25, 26	ERDS2TJ682	6.8k	R253	ERDS2TJ822	8.2k	R519, 520	ERD25TJ153	15k	R907	ERDS2TJ105	1M
R101, 102	ERDS2TJ272	2.7k	R255	ERDS2TJ273	27k	R521, 522	ERD25FJ472	4.7k	R908	ERDS2TJ471	470
R103, 104	ERDS2TJ122	1.2k	R256, 257	ERDS2TJ333	33k	R523, 524	ERD25FJ822	8.2k	R909	ERDS2TJ392	3.9k
R105, 106	ERDS2TJ470	47	R258, 259	ERDS2TJ333	33k	R525, 526	ERD25FJ102	1k	R910	ERDS2TJ223	22k
R109, 110	ERDS2TJ103	10k				R527, 528	ERD25FJ103	10k	R911	ERDS2TJ103	10k
R113, 114	ERDS2TJ103	10k	R290	ERDS2TJ103	10k	R529, 530	ERD25TJ333	33k			
R119, 120	ERDS2TJ682	6.8k	R301	ERDS2TJ1R0	1	R531, 532	ERD25FJ151	150	R912	ERDS2TJ104	100k
R121, 122	ERDS2TJ222	2.2k	R302, 303	ERDS2TJ683	68k	R533, 534	ERD25FJ472	4.7k	R913	ERDS2TJ821	820
R123, 124	ERDS2TJ822	8.2k	R304, 305	ERDS2TJ220	22	R535, 536	ERD25TJ153	15k	R914	ERG2ANJ330	33
			R306	ERDS2TJ391	390				R915	ERDS2TJ104	100k
R201, 202	ERDS2TJ222	2.2k	R307	ERDS2TJ181	180	R537, 538	ERD25TJ154	150k	R916	ERDS2TJ821	820
R203	ERDS2TJ223	22k				R539, 540	ERD25TJ244	240k	R917	ERDS2TJ104	100k
R204	ERDS2TJ153	15k	**R308**	ERD2FCG560	56	R541, 542	ERD25FJ472	4.7k	R918	ERDS2TJ821	820
R205	ERDS2TJ223	22k	[XL] only			R543, 544	ERD25TJ153	15k	except [XL]		
R206	ERDS2TJ104	100k	**R308** [other]	ERDS2TJ560	56	R545, 546	ERD25TJ153	15k	R919	ERDS2TJ391	390
R207	ERDS2TJ472	4.7k				R547	ERD25FJ102	1k	R920, 921	ERDS2TJ103	10k
R208	ERDS2TJ103	10k	R378	ERDS2TJ220	22	R549, 550	ERD25FJ332	3.3k	R922, 923	ERDS2TJ103	10k
R209	ERDS2TJ103	10k	R401, 402	ERDS2TJ242	2.4k	R551, 552	ERD25TJ104	100k			
R211, 212	ERDS2TJ472	4.7k	R403, 404	ERDS2TJ562	5.6k	R553, 554	ERD25FJ102	1k	R924, 925	ERDS2TJ103	10k
R213	ERDS2TJ152	1.5k	R405, 406	ERDS2TJ332	3.3k	R555, 556	ERD25FJ101	100	R926	ERDS2TJ121	120
			R407, 408	ERDS2TJ102	1k				R927	ERDS2TJ151	150
R214	ERDS2TJ153	15k	R409, 410	ERDS2TJ333	33k	R557, 558	ERD25FJ822	8.2k	R928	ERDS2TJ391	390
R215, 216	ERDS2TJ103	10k	R411, 412	ERDS2TJ823	82k	R559	ERD25FJ222	2.2k	R929	ERG3ANJ390	39
R217, 218	ERDS2TJ273	27k	R413, 414	ERDS2TJ272	2.7k	R560	ERD25TJ333	3.3k	[XL] only		
R219	ERDS2TJ273	27k	R415, 416	ERDS2TJ512	5.1k	R561	ERD25TJ473	47k	R929 [other]	ERG1ANJ390	39
R220	ERDS2TJ683	68k	R417, 418	ERDS2TJ683	68k	R562	ERD25FJ822	8.2k	R934	ERDS2TJ471	470
R221	ERDS2TJ101	100				R563, 564	ERD25TJ153	15k	[XL] only		
R224	ERDS2TJ333	33k	R419, 420	ERDS2TJ222	2.2k	R571, 572	ERDS2TJ152	1.5k	R935	ERDS2TJ224	220k
R225	ERDS2TJ223	22k	R421, 422	ERDS2TJ823	82k	R573, 574	ERDS2TJ822	8.2k	[XL] only		
R226	ERDS2TJ472	4.7k	R423, 424	ERDS2TJ684	680k	R575, 576	ERDS2TJ562	5.6k	R936	ERDS2TJ331	330
R227	ERDS2TJ682	6.8k	R425, 426	ERDS2TJ684	680k	R577, 578	ERDS2TJ472	4.7k	[XL] only		
			R427, 428	ERDS2TJ103	10k	R601, 602	ERDS2TJ391	390	R937, 938	ERDS2TJ472	4.7k
R228	ERDS2TJ103	10k	R451, 452	ERDS2TJ332	3.3k	R603, 604	ERDS1FJ470	47	[XL] only		
R229	ERDS2TJ273	27k	R453, 454	ERDS2TJ562	5.6k	R605, 606 ⚠	ERQ14LKR22	0.22			
R230	ERDS2TJ393	39k	R455, 456	ERDS2TJ121	120	[XL] only			R939	ERDS2TJ271	270
R231	ERDS2TJ273	27k	R457, 458	ERDS2TJ470	47	R609	ERDS2TJ470	47	[XL] only		
R232	ERDS2TJ392	3.9k	R491, 492	ERDS2TJ272	2.7k	[XL] only					

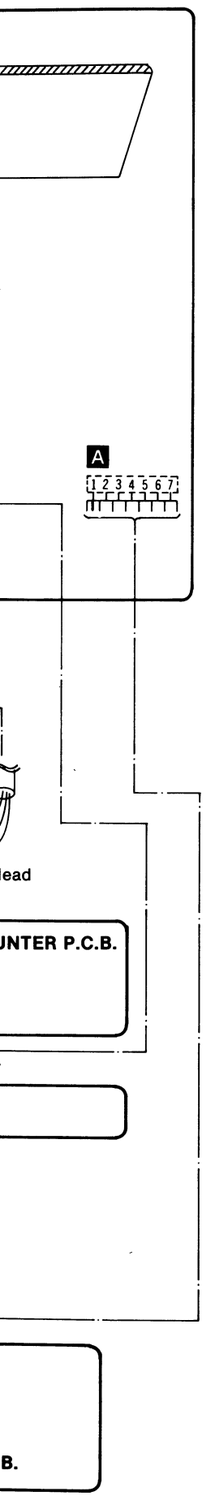
• CAPACITORS

Ref. No.	Part No.
C1, 2	ECKD1H122
C3, 4	ECKD1H681
C5, 6	ECKD1H681
C7, 8	ECEA1EU4F
C9, 10	ECEA0JU22
C11, 12	ECQB1H562
C15, 16	ECEA1CU10
C17, 18	ECEA1HU01
C101, 102	ECKD1H102
C103, 104	ECEA1HU01
C105, 106	ECQB1H822
C109, 110	ECQM1H273
C113, 114	ECEA1CU10
C117, 118	ECKD1H561
C119, 120	ECKD2H121
C121, 122	ECQB1H472
C125, 126	ECQB1H103
C127, 128	ECQM1H103
C201	ECFD1E104
C202	ECEA1EU4F
C203	ECEA1CKS1
C204	ECEA1HUR4
C205	ECFD1H822
C206	ECEA1CU10
C207	ECCD1H470
C208	ECEA1HU01
C209	ECEA1AU22

■ ELECTRIC

Notes: • Part numbers
Please use th

Ref. No.	Part
INTEGRATED CIRCUITS	
IC1	AN7014
IC101	MN6634
IC102	M5218L
IC103, 104	AN6203
IC401, 402	TEA066
IC501	AN6291
IC502	M5218P
IC701	AN6870
IC702	LM6417
IC901	LM6416
IC902	BA6218
TRANSISTORS	
Q1, 2	2SJ103
Q101, 102, 107, 108, 202, 203	2SA130
Q103 ~ 106, 111, 112, 204, 251 ~ 253, 301, 302, 401 ~ 404, 902, 903	2SC331
Q109, 110	2SD133
Q201	2SB103
Q205, 206	2SA125
Q501 ~ 508	2SC260
Q509, 510	2SD142
Q511, 512	2SA111
Q513	2SC260
Q601	2SD126
Q602	2SB941
Q603, 901	2SC184



■ RESISTORS AND CAPACITORS

Notes:
- Part numbers are indicated on most mechanical parts. Please use this part number for parts order.
- The unit of resistance is Ω (ohm). K=1000Ω, M=1000kΩ
- The unit of capacitance is μF (microfarad). P=10^{-6}μF.
- Bracketed indications in Ref. columns specify the area. Parts without these indications can be used for all area.

Resistor Type		Wattage		Tolerance	
ERD	: Carbon	10	: 1/8W	G	: ±2%
ERO	: Film	12	: 1/2W	J	: ±5%
ERG	: Metal Oxide	25	: 1/4W		
ERC	: Solid	1	: 1W		
		2	: 2W		
		S1	: 1/2W		
		S2	: 1/4W		

ERD10TLJ□□□ → Chip type carbon
ERO10MKG□□□ → Chip type metal film

Capacitor Type		Voltage				Tolerance	
		ECEA Type		Other			
ECEA	: Electrolytic	0J	: 6.3V	1H	: 50V	C	: ±0.25pF
ECCD	: Ceramic	1A	: 10V	2H	: 500V	J	: ±5%
ECKD	: Ceramic	1C	: 16V	1	: 100V	K	: +10%
ECQM	: Polyester	1E	: 25V	KC	: 400V	Z	: +80%, −20%
ECQP	: Polyester	1H	: 50V			Y	: ±22%
ECET	: Electrolytic	1J	: 63V				
ECEA...N	: Non-polar Electrolytic	1V	: 35V				
		25	: 25V				
		56	: 56V				

• RESISTORS

Ref. No.	Part No.	Value	Ref. No.	Part No.	Value	Ref. No.	Part No.	Value	Ref. No.	Part No.	Value
R1, 2	ERDS2TJ223	22k	R233	ERDS2TJ393	39k	R493, 494	ERDS2TJ123	12k	R611	ERDS2TJ101	100
R3, 4	ERDS2TJ472	4.7k	R234	ERDS2TJ393	39k	R495, 496	ERDS2TJ153	15k	R701, 702	ERDS2TJ104	100k
R5, 6	ERDS2TJ155	1.5M	R235	ERDS2TJ103	10k	R502	ERD25TJ123	12k	R703, 704	ERDS2TJ102	1k
R7, 8	ERDS2TJ101	100	R236	ERDS2TJ563	56k	R503, 504	ERD25FJ102	1k	R705, 706	ERDS2TJ181	180
R9, 10	ERDS2TJ101	100	R237	ERDS2TJ102	1k	R505, 506	ERD25TJ104	100k	R707	ERDS2TJ181	180
R13, 14	ERDS2TJ473	47k				R507, 508	ERD25TJ104	100k	R708	ERDS2TJ103	10k
R15, 16	ERDS2TJ102	1k	R238	ERDS2TJ101	100	R510	ERD25FJ103	10k			
R17, 18	ERDS2TJ820	82	R239, 240	ERDS2TJ223	22k	R511, 512	ERD25TJ563	56k	R901	ERDS2TJ102	1k
R19, 20	ERDS2TJ102	1k	R241	ERDS2TJ473	47k	R513, 514	ERD25TJ223	22k	R902	ERDS2TJ182	1.8k
R21, 22	ERDS2TJ153	15k	R243	ERDS2TJ103	10k	R515, 516	ERD25FJ332	3.3k	R903	ERDS2TJ103	10k
			R244	ERDS2TJ183	18k				R904	ERDS2TJ471	470
R23, 24	ERDS2TJ564	560k	R251, 252	ERDS2TJ822	8.2k	R517, 518	ERD25TJ563	56k	R905, 906	ERDS2TJ103	10k
R25, 26	ERDS2TJ682	6.8k	R253	ERDS2TJ822	8.2k	R519, 520	ERD25TJ153	15k	R907	ERDS2TJ105	1M
R101, 102	ERDS2TJ272	2.7k	R255	ERDS2TJ273	27k	R521, 522	ERD25FJ472	4.7k	R908	ERDS2TJ471	470
R103, 104	ERDS2TJ122	1.2k	R256, 257	ERDS2TJ333	33k	R523, 524	ERD25FJ822	8.2k	R909	ERDS2TJ392	3.9k
R105, 106	ERDS2TJ470	47	R258, 259	ERDS2TJ333	33k	R525, 526	ERD25FJ102	1k	R910	ERDS2TJ223	22k
R109, 110	ERDS2TJ103	10k				R527, 528	ERD25FJ103	10k	R911	ERDS2TJ103	10k
R113, 114	ERDS2TJ103	10k	R290	ERDS2TJ103	10k	R529, 530	ERD25TJ333	33k			
R119, 120	ERDS2TJ682	6.8k	R301	ERDS2TJ1R0	1	R531, 532	ERD25FJ151	150	R912	ERDS2TJ104	100k
R121, 122	ERDS2TJ222	2.2k	R302, 303	ERDS2TJ683	68k	R533, 534	ERD25FJ472	4.7k	R913	ERDS2TJ821	820
R123, 124	ERDS2TJ822	8.2k	R304, 305	ERDS2TJ220	22	R535, 536	ERD25TJ153	15k	R914	ERG2ANJ330	33
			R306	ERDS2TJ391	390				R915	ERDS2TJ104	100k
R201, 202	ERDS2TJ222	2.2k	R307	ERDS2TJ181	180	R537, 538	ERD25TJ154	150k	R916	ERDS2TJ821	820
R203	ERDS2TJ223	22k				R539, 540	ERD25TJ244	240k	R917	ERDS2TJ104	100k
R204	ERDS2TJ153	15k	**R308**	ERD2FCG560	56	R541, 542	ERD25FJ472	4.7k	R918	ERDS2TJ821	820
R205	ERDS2TJ223	22k	[XL] only			R543, 544	ERD25TJ153	15k	except [XL]		
R206	ERDS2TJ104	100k	**R308** [other]	ERDS2TJ560	56	R545, 546	ERD25TJ153	15k	R919	ERDS2TJ391	390
R207	ERDS2TJ472	4.7k				R547	ERD25FJ102	1k	R920, 921	ERDS2TJ103	10k
R208	ERDS2TJ103	10k	R378	ERDS2TJ220	22	R549, 550	ERD25FJ332	3.3k	R922, 923	ERDS2TJ103	10k
R209	ERDS2TJ103	10k	R401, 402	ERDS2TJ242	2.4k	R551, 552	ERD25TJ104	100k			
R211, 212	ERDS2TJ472	4.7k	R403, 404	ERDS2TJ562	5.6k	R553, 554	ERD25FJ102	1k	R924, 925	ERDS2TJ103	10k
R213	ERDS2TJ152	1.5k	R405, 406	ERDS2TJ332	3.3k	R555, 556	ERD25FJ101	100	R926	ERDS2TJ121	120
			R407, 408	ERDS2TJ102	1k				R927	ERDS2TJ151	150
R214	ERDS2TJ153	15k	R409, 410	ERDS2TJ333	33k	R557, 558	ERD25FJ822	8.2k	R928	ERDS2TJ391	390
R215, 216	ERDS2TJ103	10k	R411, 412	ERDS2TJ823	82k	R559	ERD25FJ222	2.2k	R929	ERG3ANJ390	39
R217, 218	ERDS2TJ273	27k	R413, 414	ERDS2TJ272	2.7k	R560	ERD25TJ333	3.3k	[XL] only		
R219	ERDS2TJ273	27k	R415, 416	ERDS2TJ512	5.1k	R561	ERD25TJ473	47k	R929 [other]	ERG1ANJ390	39
R220	ERDS2TJ683	68k	R417, 418	ERDS2TJ683	68k	R562	ERD25FJ822	8.2k	R934	ERDS2TJ471	470
R221	ERDS2TJ101	100				R563, 564	ERD25TJ153	15k	[XL] only		
R224	ERDS2TJ333	33k	R419, 420	ERDS2TJ222	2.2k	R571, 572	ERDS2TJ152	1.5k	R935	ERDS2TJ224	220k
R225	ERDS2TJ223	22k	R421, 422	ERDS2TJ823	82k	R573, 574	ERDS2TJ822	8.2k	[XL] only		
R226	ERDS2TJ472	4.7k	R423, 424	ERDS2TJ684	680k	R575, 576	ERDS2TJ562	5.6k	R936	ERDS2TJ331	330
R227	ERDS2TJ682	6.8k	R425, 426	ERDS2TJ684	680k	R577, 578	ERDS2TJ472	4.7k	[XL] only		
			R427, 428	ERDS2TJ103	10k	R601, 602	ERDS2TJ391	390	R937, 938	ERDS2TJ472	4.7k
R228	ERDS2TJ103	10k	R451, 452	ERDS2TJ332	3.3k	R603, 604	ERDS1FJ470	47	[XL] only		
R229	ERDS2TJ273	27k	R453, 454	ERDS2TJ562	5.6k	R605, 606 ⚠	ERQ14LKR22	0.22			
R230	ERDS2TJ393	39k	R455, 456	ERDS2TJ121	120	[XL] only			R939	ERDS2TJ271	270
R231	ERDS2TJ273	27k	R457, 458	ERDS2TJ470	47	R609	ERDS2TJ470	47	[XL] only		
R232	ERDS2TJ392	3.9k	R491, 492	ERDS2TJ272	2.7k	[XL] only					

• CAPACITORS

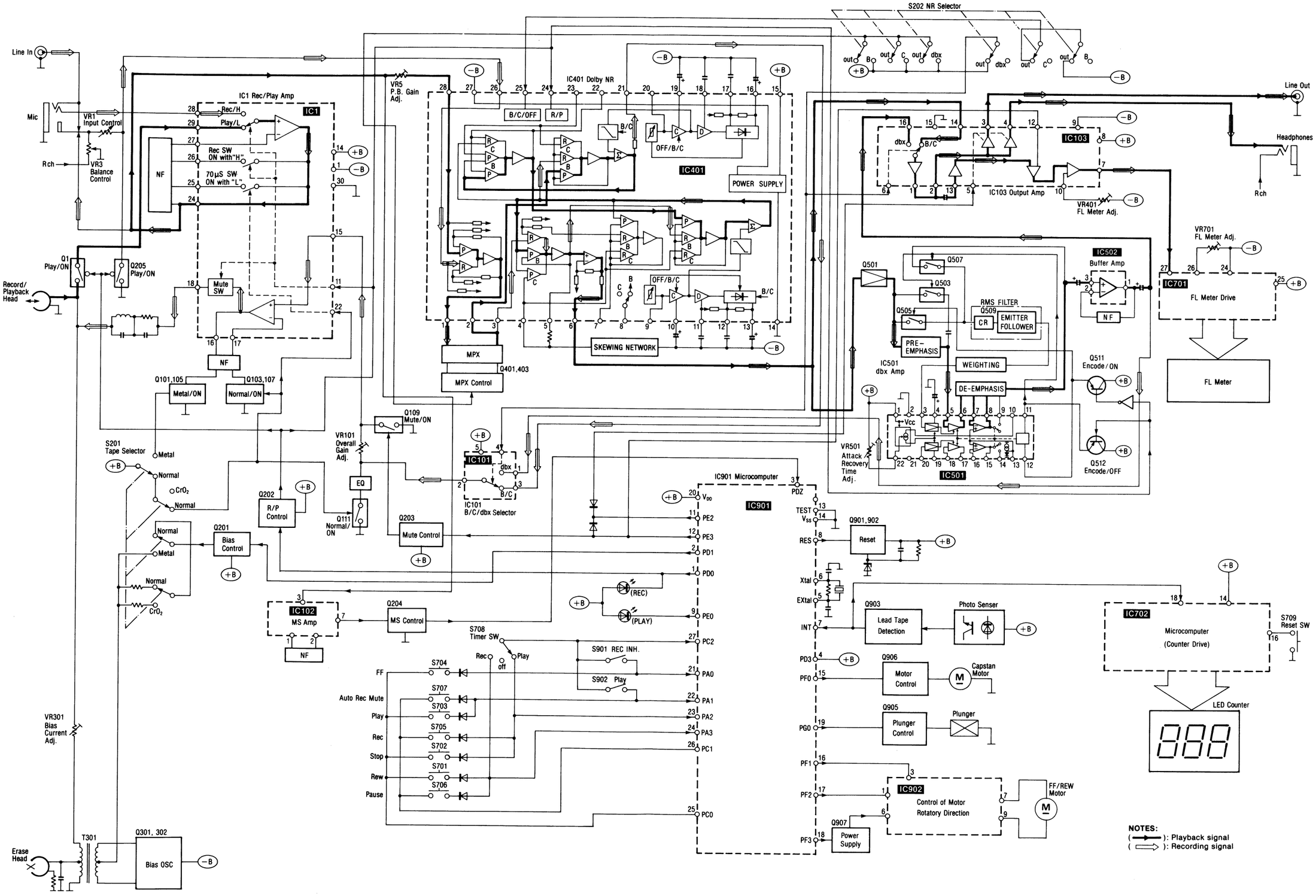
Ref. No.	Part No.	Value	Ref. No.	Part No.	Value	Ref. No.	Part No.	Value	Ref. No.	Part No.	Value
C1, 2	ECKD1H122KB	0.0012	C251	ECEA1HKS010	1	C427, 428	ECQB1H122JZ	0.0012	C541, 542	ECEA1CU100	10
C3, 4	ECKD1H681KB	680p	C252	ECKD1H221KB	220p	C429, 430	ECEA1CU100	10	C543, 544	ECCD1H181K	180p
C5, 6	ECKD1H681KB	680p	C253	ECEA1CKS100	10	C431, 432	ECEA1CU100	10	C601	ECEA1CU331	330
C7, 8	ECEA1EU4R7	4.7				C451, 452	ECEA1HUR33	0.33	C602	ECEA1CU102	0.001
C9, 10	ECEA0JU221	220	C255	ECKD1H333ZF	0.033	C453, 454	ECEA1CU100	10	C603, 604	ECKD1H103ZF	0.01
C11, 12	ECQB1H562JZ	0.0056	C256	ECEA1HKSR33	0.33	C455, 456	ECKD1H102KB	0.001	C605	ECEA1CU332	0.0033
C15, 16	ECEA1CU100	10	C257, 258	ECEA1HKSR33	0.33	C502	ECEA1CU100	10	C606	ECEA1CU222	0.0022
C17, 18	ECEA1HU010	1	C259	ECEA1AU470	47				C608	ECKD2H682PEL	0.0068
C101, 102	ECKD1H102KB	0.001	C301	ECQP1183JZ	0.018	C503, 504	ECEA1HUR22	0.22	C609, 610	ECEA1AU471	470
C103, 104	ECEA1HU010	1	C302	ECKD1H332KB	0.0033	C505, 506	ECEA50MR68R	0.68	C611	ECEA1AU331	330
			C303	ECFD1H222KD	0.0022	C507, 508	ECCD1H471K	470p			
C105, 106	ECQB1H822JZ	0.0082	C304	ECKD1H682KB	0.0068	C509, 510	ECQB1H223JZ	0.022	C612, 613	ECKD1H103ZF	0.01
C109, 110	ECQM1H273JZ	0.027	C305	ECFD1H222KD	0.0022	C511, 512	ECEA1CU100	10	C615 ⚠	ECKDNS103ZV	0.01
C113, 114	ECEA1CU100	10	C306	ECEA1EU4R7	4.7	C513, 514	ECQM1H333JZ	0.033	C620	ECEA0JU331	330
C117, 118	ECKD1H561KB	560p				C515, 516	ECEA0JU470	47	C701, 702	ECEA1EU4R7	4.7
C119, 120	ECKD2H121KB	120p	C401, 402	ECCD1H820K	82p	C517, 518	ECQM1H104JZ	0.1	C703, 704	ECFD1E104MD	0.1
C121, 122	ECQB1H472JZ	0.0047	C403, 404	ECQB1H472JZ	0.0047	C519, 520	ECQM1H104JZ	0.1	C705	ECFD1V473KD	0.047
C125, 126	ECQB1H103JZ	0.01	C405, 406	ECEA1CU100	10	C521, 522	ECEA50MR33R	0.33	C710	ECEA1EU220	22
C127, 128	ECQM1H103JZ	0.01	C407, 408	ECQM1H473JZ	0.047				C901	ECKD1H103ZF	0.01
C201	ECFD1E104MD	0.1	C409, 410	ECQM1H224JZ	0.22	C523, 524	ECCD1H391K	390p	C902	ECEA0JU101	100
C202	ECEA1EU4R7	4.7	C411, 412	ECEA50MR68R	0.68	C525, 526	ECQB1H472JZ	0.0047	C903	ECKD1H103ZF	0.01
			C413, 414	ECQB1H103JZ	0.01	C527, 528	ECQB1H223JZ	0.022			
C203	ECEA1CKS100	10	C415, 416	ECQM1H473JZ	0.047	C529, 530	ECQB1H332JZ	0.0033	C904	ECEA1HU010	1
C204	ECEA1HUR47	0.47	C417, 418	ECEA1CU100	10	C531	ECEA1CU100	10	C905, 906	ECKD1H221KB	220p
C205	ECFD1H822KDY	0.0082	C419, 420	ECQM1H473JZ	0.047	C532	ECEA1HU010	1	C907	ECEA1HU010	1
C206	ECEA1CU100	10				C533, 534	ECQB1H332JZ	0.0033	C908	ECEA1CN100	10
C207	ECCD1H470K	47p	C421, 422	ECQM1H224JZ	0.22	C535, 536	ECEA1CU100	10	C909	ECKD1H103ZF	0.01
C208	ECEA1HU010	1	C423, 424	ECEA50MR68R	0.68	C537, 538	ECCD1H331K	330p	C910	ECKD1H103ZF	0.01
C209	ECEA1AU220	22	C425, 426	ECQB1H152JZ	0.0015	C539, 540	ECEA1HUR33	0.33	[XL] only		

■ ELECTRICAL PARTS LIST

Notes:
- Part numbers are indicated on most mechanical parts. Please use this part number for parts order.
- Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

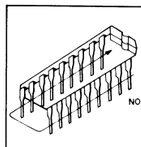
Ref. No.	Part No.	Description
INTEGRATED CIRCUITS		
IC1	AN7014K	Integrated Circuit
IC101	MN6634	Integrated Circuit
IC102	M5218L	Integrated Circuit
IC103, 104	AN6203	Integrated Circuit
IC401, 402	TEA0665	Integrated Circuit
IC501	AN6291	Integrated Circuit
IC502	M5218P	Integrated Circuit
IC701	AN6870N	Integrated Circuit
IC702	LM6417E – 589	Integrated Circuit
IC901	LM6416E – 1984	Integrated Circuit
IC902	BA6218	Integrated Circuit
TRANSISTORS		
Q1, 2	2SJ103GR	Transistor
Q101, 102, 107, 108, 202, 203	2SA1309Q	Transistor
Q103 ~ 106, 111, 112, 204, 251 ~ 253, 301, 302, 401 ~ 404, 902, 903	2SC3311A – Q	Transistor
Q109, 110	2SD1330R	Transistor
Q201	2SB1030Q	Transistor
Q205, 206	2SA1253 – S	Transistor
Q501 ~ 508	2SC2603EFG	Transistor
Q509, 510	2SD1424R	Transistor
Q511, 512	2SA1115E	Transistor
Q513	2SC2603EFG	Transistor
Q601	2SD1265 – 0	Transistor
Q602	2SB941 – P	Transistor
Q603, 901	2SC1846 – R	Transistor
Q904, 905	2SB1030Q	Transistor
Q906	2SB621A – R	Transistor
Q907	2SD592ANCQ	Transistor
Q908 [XL] only	2SC3311A – Q	Transistor
DIODES & RECTIFIERS		
D1, 2, 201 ~ 209, 211, 251 ~ 260, 603, 604, 904 ~ 908	MA165	Diode
D261	LN346GP	LED
D262	LN846RP	LED
D263	SVGLB203DN1	Diode
D501	SVDMC911	Diode
D601 ⚠	MA4100M	Diode
D605 ~ 608 ⚠	1SR35200	Diode
D611	MA4051M	Diode
D901, 902	MA4056 – M	Diode
D903	MA4082H	Diode
VARIABLE RESISTORS		
VR1, 2	EWC5SA000A54	Variable Resistor
VR3	EWHFDAF15G15	Variable Resistor
VR5, 6, 701	EVND4AA00B24	Variable Resistor
VR101, 102	EVND4AA00B54	Variable Resistor
VR301, 302	EVND4AA00B15	Variable Resistor
VR401	EVND4AA00B23	Variable Resistor
VR501	EVND4AA00B23	Variable Resistor
COILS		
L101, 102	SLQX303 – 1K	Coil
L103, 104	QLQX2722D	Coil
L401, 402	QLM9Z10K	Coil
L403, 404	ELM7Q306A	Coil
SPARK LILLERS OR COMBINATION PARTS		
Z 251	EXBF8E561J4R	Component Conbination
FLUORESCENT DISPLAY TUBE		
FL1	SADBG369Z	FL Meter
RESONATORS		
X901	SVFCSB400P – M	Ceramic Filter
IC PROTECTOR		
ICP601, 602 [XL] only	SRUN15	IC Protector
ICP901 [XL] only	SRUN10	IC Protector
TRANSFORMERS		
T301	SL09C19 – K	Oscillator Coil
T600 [EG, EH] ⚠	SLT5V04 – K	Power Transformer
T600 [XL] ⚠	SLT5V05 – K	Power Transformer
T600 [XA, XB] ⚠	SLT5V06 – K	Power Transformer
T600 [MC] ⚠	SLT5V07 – K	Power Transformer
SWITCHES		
S201	SSH3700	Tape Selector
S202	SSH4104	Dolby NR
S601 ⚠	ESB8215V	Power Source
S602 ⚠ [XL, XA, XB] only	SSR187 – 1	Voltage Selector
S701 ~ 707, 709	SSG13	Key Board
S708	QSS1305H	Timer
S901	SMQA1040	Leaf Switch
S902	SMQA1023	Leaf Switch

■ BLOCK DIAGRAM

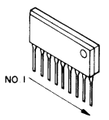


NOTES:
(⟶): Playback signal
(⟹): Recording signal

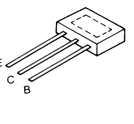
• Terminal Guide of T



AN6203
LM6417
LM6416
AN6291

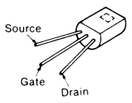


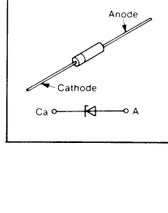
M5218L
BA6218
MN6634



2SA13
2SC33
2SA12
2SD14
2SC18

2SJ103GRY

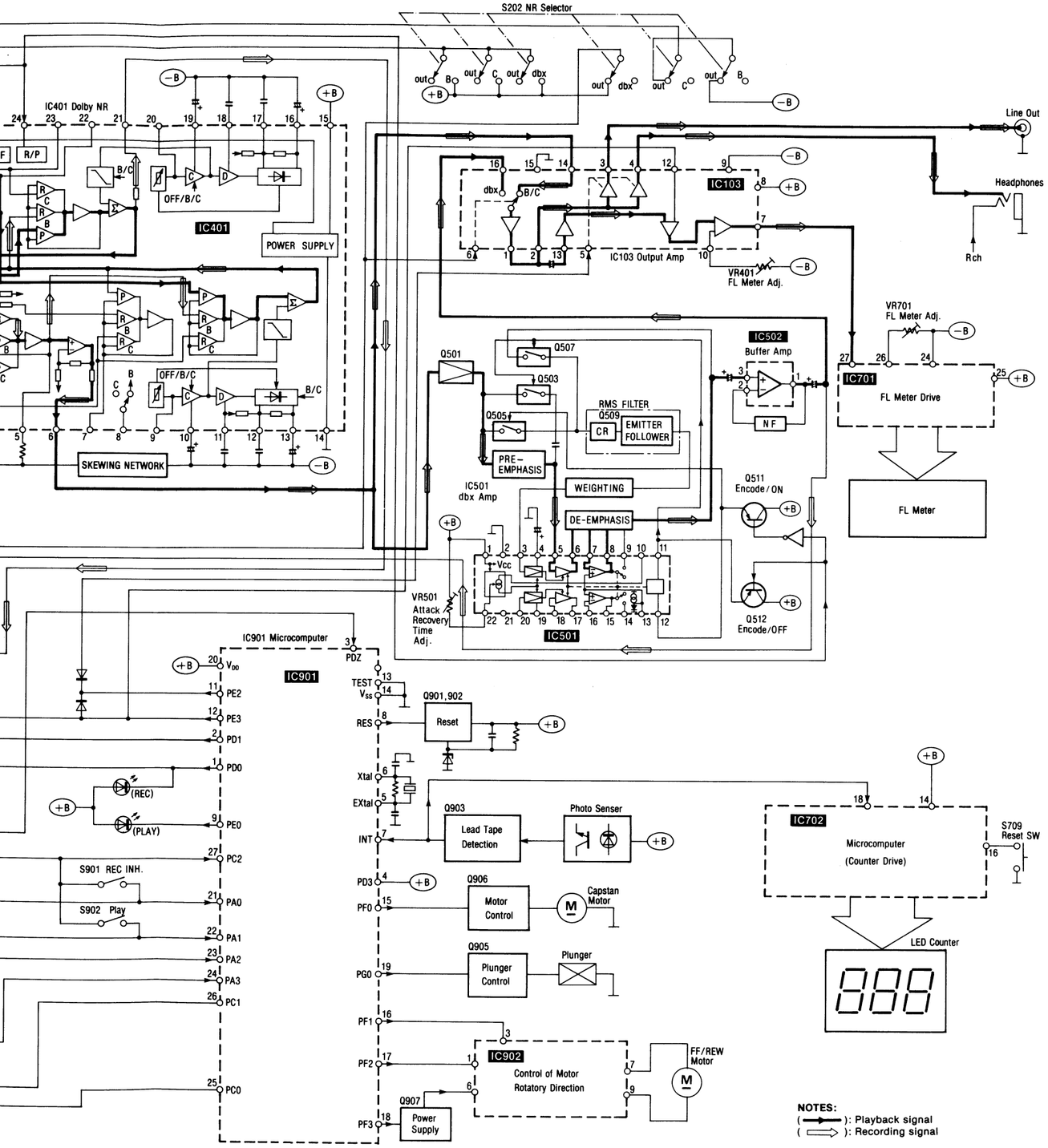




MA40
MA40
MA40
MA42
MA41

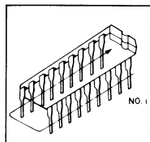
SPECIFICATIONS * Inp

Playback S/N ratio * Test tape... QZZCFM
Overall distortion * Test tape ... QZZCRA for Normal ... QZZCRX for CrO_2 ... QZZCRZ for Metal
Overall S/N ratio * Test tape... QZZCRA

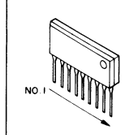


NOTES:
(⟶): Playback signal
(⟹): Recording signal

• Terminal Guide of Transistors Diodes and IC's

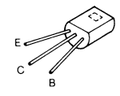


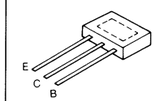
AN6203	16 Pin	TEA0665	28 Pin
LM6417E-589	22 Pin	AN6870N	28 Pin
LM6416E-1984	28 Pin	AN7014K	30 Pin
AN6291	22 Pin	M5218P	8 Pin



M5218L	8 Pin
BA6218	9 Pin
MN6634	9 Pin

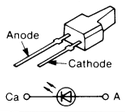
2SB1030QRS
2SB621ARS



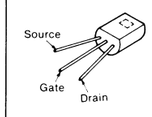


2SA1309AQS
2SC3311AQS
2SA1253R
2SD1450R
2SC1846QRS

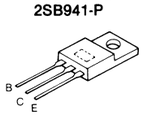
LN346GP (Green)
LN846RP (Red)



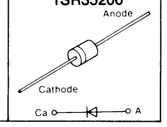
2SJ103GRY

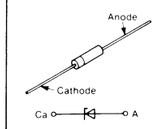


2SD1265-O
2SB941-P



1SS254
1SR35200





MA4062M
MA4051L
MA4075H
MA4200M
MA4100M

SPECIFICATIONS ∗ Input level control ... MAX

Playback S/N ratio ∗ Test tape ... QZZCFM	Greater than 45 dB
Overall distortion ∗ Test tape ... QZZCRA for Normal ... QZZCRX for CrO_2 ... QZZCRZ for Metal	Normal ..... Less than 3.5% CrO_2, Metal ... Less than 4%
Overall S/N ratio ∗ Test tape ... QZZCRA	Greater than 43 dB (without NAB filter)

■ SCHEMATIC DIAGRAM

Notes:

- **S201-1, S201-2** : Tape select switch in "**normal**" position. (S201-1 ▬: CrO_2, S201-2 ▬: Metal, S201-1, S201-2 ▙: Normal)
- **S202-1～S202-3** : NR select switch in "**out**" position. (S202-1 ▬: B, S202-2 ▬: C, S202-3 ▬: dbx, S202-1～S202-3 ▙: out)
- **S601-1, S601-2** : Power switch in "**on**" position.
- **S602** : Voltage select switch in "**240 V**" position. (240 V↔220 V↔127 V↔110 V) ([XA, XL, XB] areas only.)
- **S701** : Rew switch in "**off**" position.
- **S702** : Stop switch in "**off**" position.
- **S703** : Play switch in "**off**" position.
- **S704** : FF switch in "**off**" position.
- **S705** : Rec switch in "**off**" position.
- **S706** : Pause switch in "**off**" position.
- **S707** : Auto rec mute switch in "**off**" position.
- **S708** : Timer switch in "**off**" position.
- **S709** : Counter reset switch in "**off**" position.
- **S901** : Rec inhibit switch in "**off**" position.
- **S902** : Mechanism play switch in "**off**" position.

- Resistance are in ohms (Ω), 1/4 watt unless specified otherwise. 1 K=1,000 (Ω), 1 M=1,000 k (Ω)
- Capacity are in micro-farads (μF) unless specified otherwise.
- All voltage values shown in circuitry are under no signal condition and playback mode with volume control at minimum position otherwise specified.
  ( ) .....Voltage values at record mode.
  For measurement use EVM.

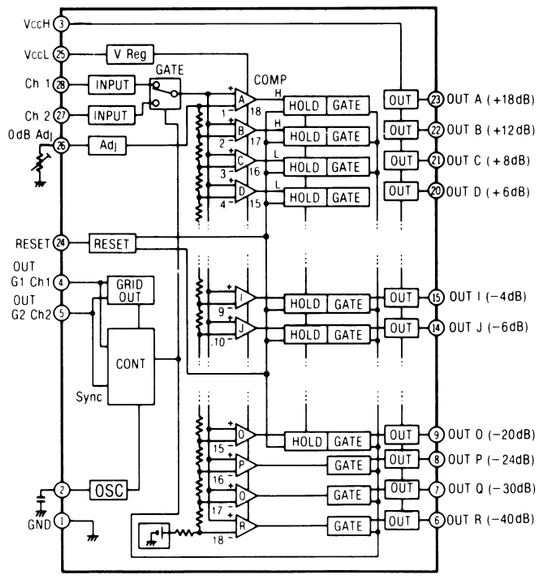
- Important safety notice
  Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

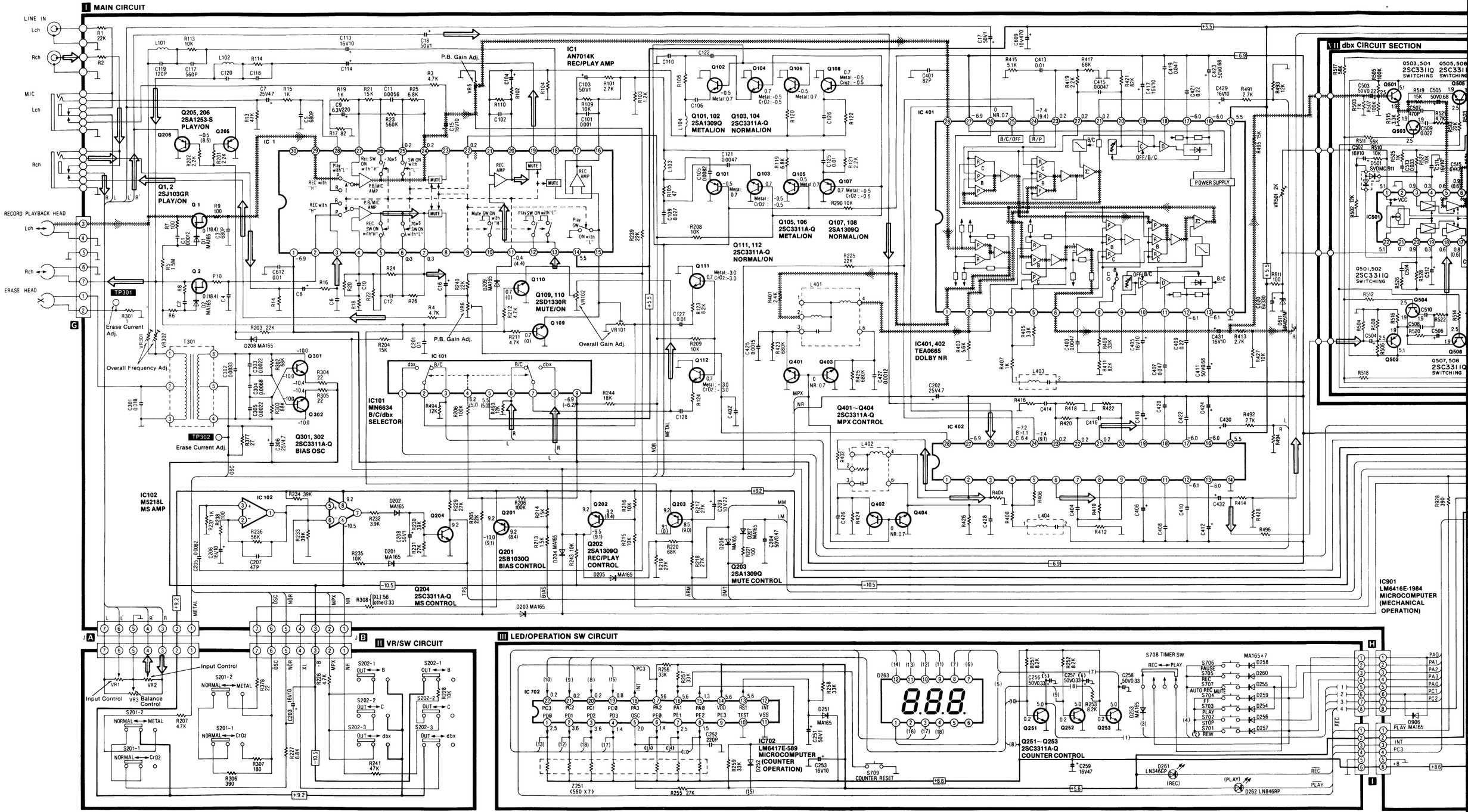
∗ Caution!

IC and LSI are sensitive to static electricity.
Secondary trouble can be prevented by taking care during repair.

- Cover the parts boxes made of plastics with aluminum foil.
- Ground the soldering iron.
- Put a conductive mat on the work table.
- Do not touch the legs of IC or LSI with the fingers directly.

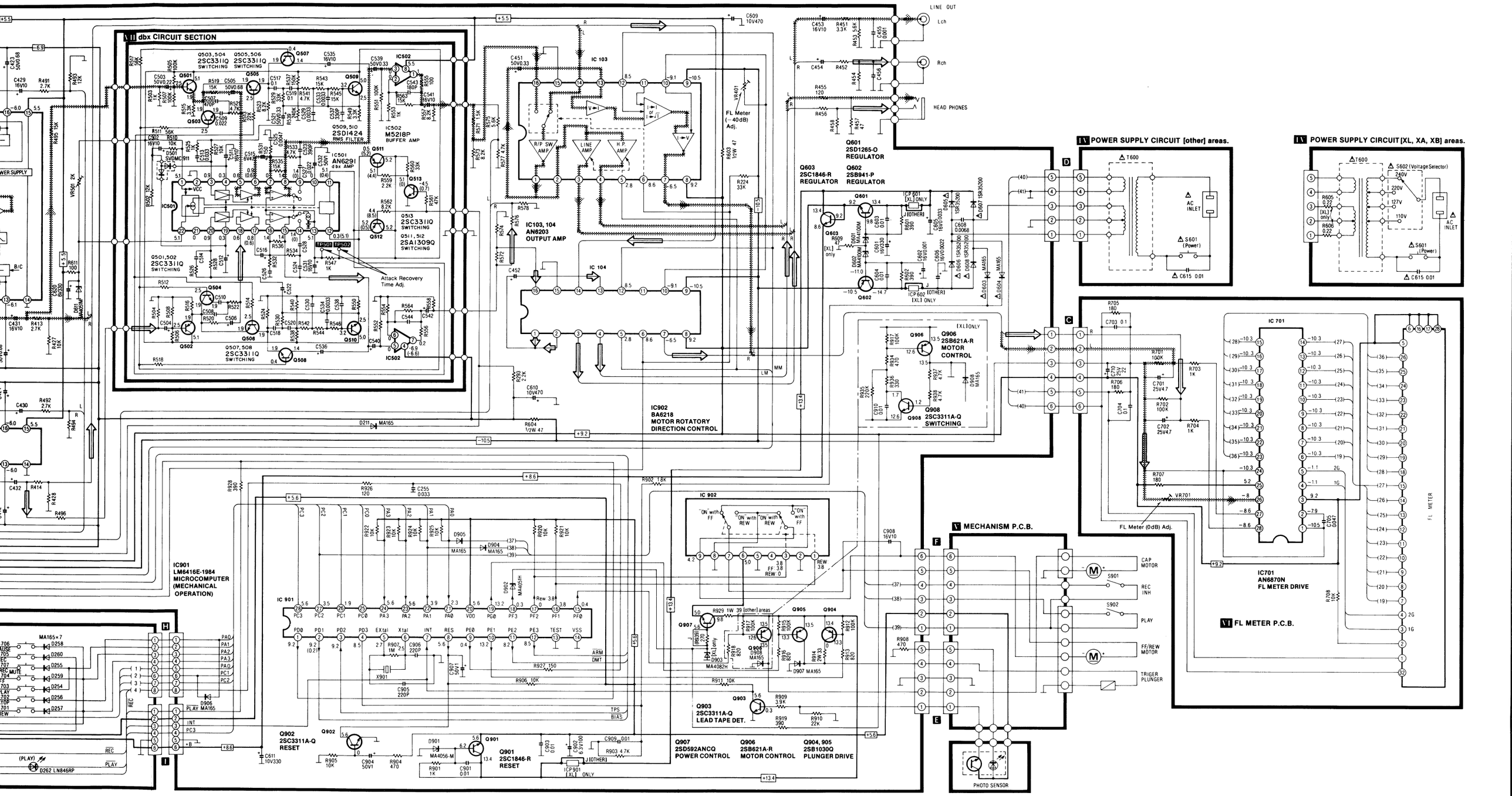
EQUIVALENT CIRCUIT
IC701: AN6870N



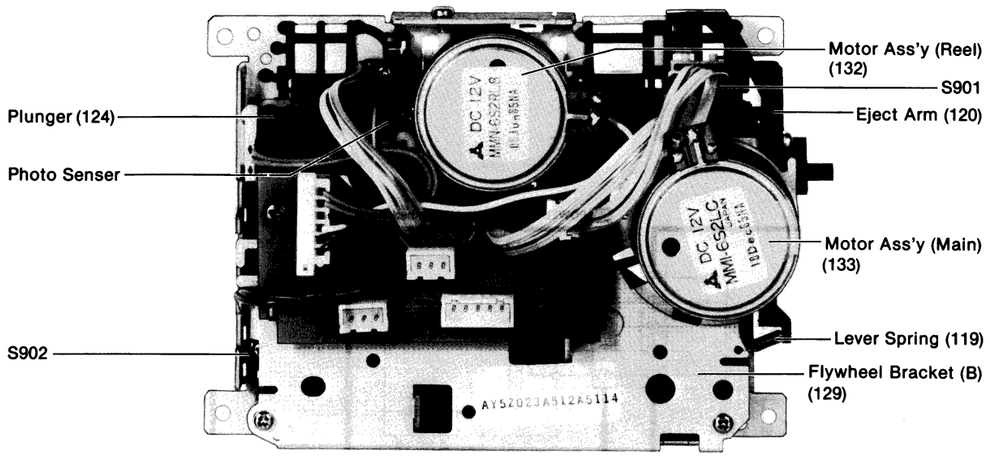


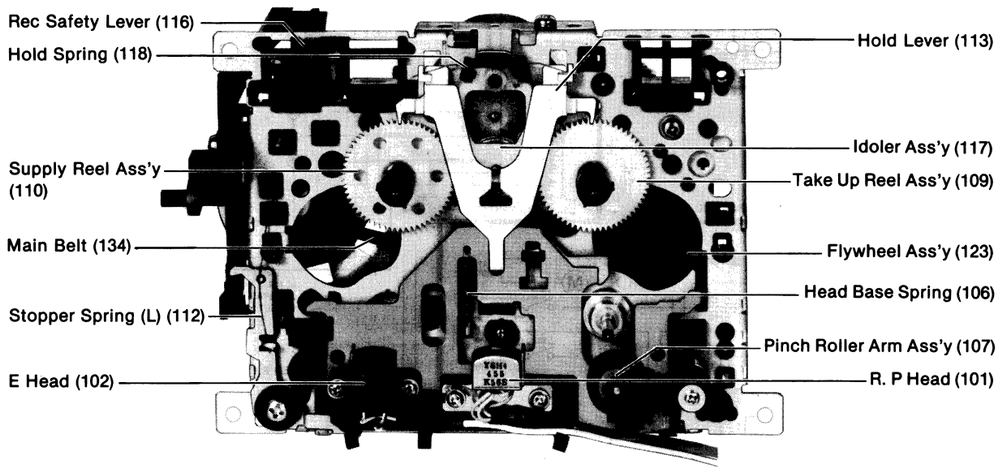
Notes:

- (——) indicates B (bias).
- (▒▒▒) indicates the flow of the playback signal.
- (⇨) indicates the flow of the record signal.


II dbx CIRCUIT SECTION
IC501 AN6291 dbx AMP
IC502 M5218P BUFFER AMP
IC502 2SD1424 RMS FILTER
IC103, 104 AN6203 OUTPUT AMP
IC902 BA6218 MOTOR ROTATORY DIRECTION CONTROL
IC901 LM6416E-1984 MICROCOMPUTER (MECHANICAL OPERATION)
IC 701 AN6870N FL METER DRIVE
Q501,502 2SC3311Q SWITCHING
Q503,504 2SC3311Q SWITCHING
Q505,506 2SC3311Q SWITCHING
Q507,508 2SC3311Q SWITCHING
Q509,510 2SA1309Q SWITCHING
Q511,512 2SC3311Q SWITCHING
Q513 2SC3311Q SWITCHING
Q601 2SD1265-O REGULATOR
Q602 2SB941-P REGULATOR
Q603 2SC1846-R REGULATOR
Q902 2SC3311A-Q RESET
Q901 2SC1846-R RESET
Q903 2SC3311A-Q LEAD TAPE DET.
Q904, 905 2SB1030Q PLUNGER DRIVE
Q906 2SB621A-R MOTOR CONTROL
Q907 2SD592ANCQ POWER CONTROL
Q908 2SC3311A-Q SWITCHING
FL Meter (-40dB) Adj.
Attack Recovery Time Adj.
LINE OUT
Lch
Rch
HEAD PHONES
IV POWER SUPPLY CIRCUIT [other] areas.
IV POWER SUPPLY CIRCUIT [XL, XA, XB] areas.
V MECHANISM P.C.B.
VI FL METER P.C.B.
CAP MOTOR
REC INH
PLAY
FF/REW MOTOR
TRIGER PLUNGER
PHOTO SENSOR
FL Meter (0dB) Adj.
FL METER
AC INLET
S601 (Power)
S602 (Voltage Selector)
240V
220V
127V
110V
REC
PLAY
INT
PC3
+B
ARM
DMT
TPS
BIAS

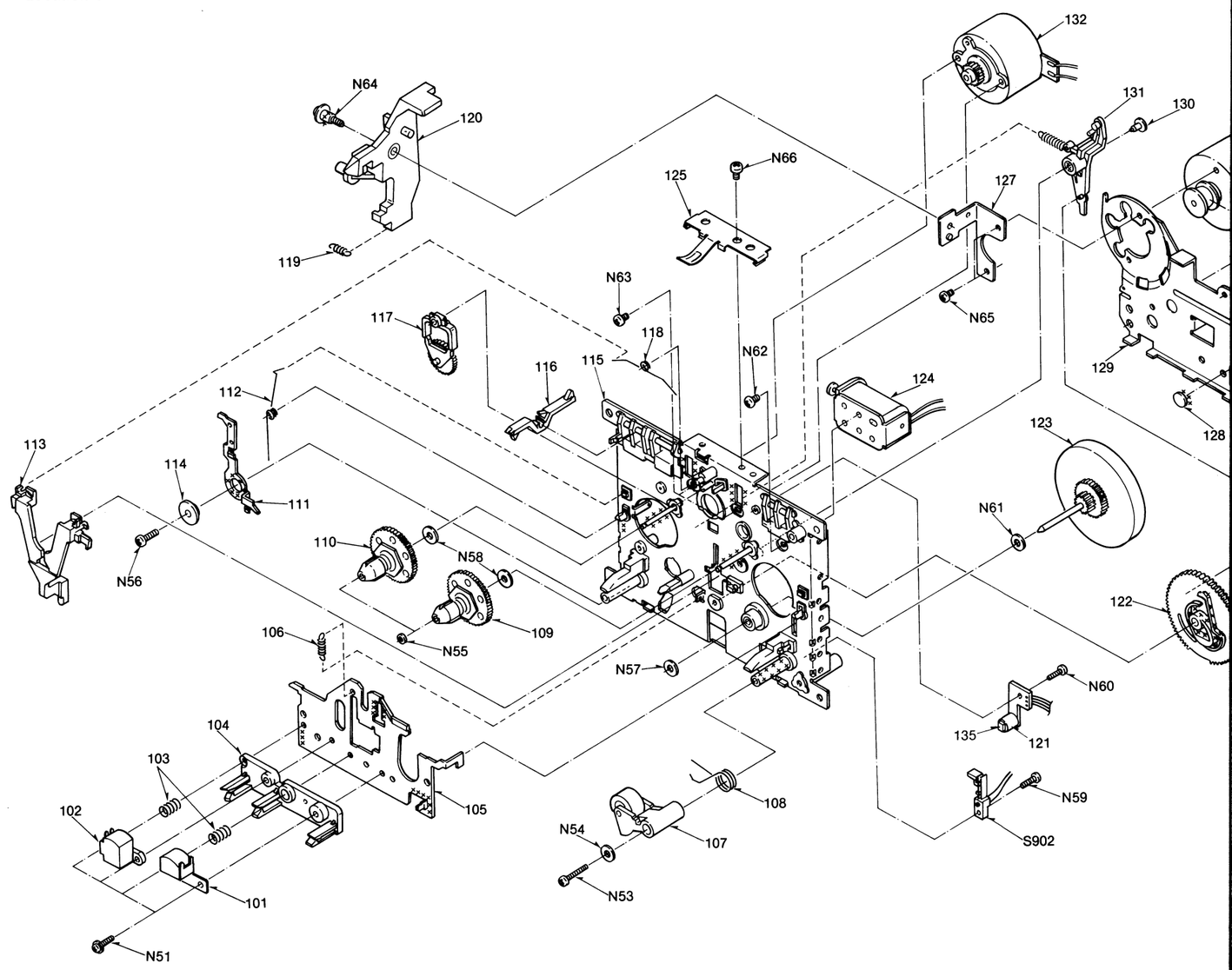
■ MECHANICAL PARTS LOCATION





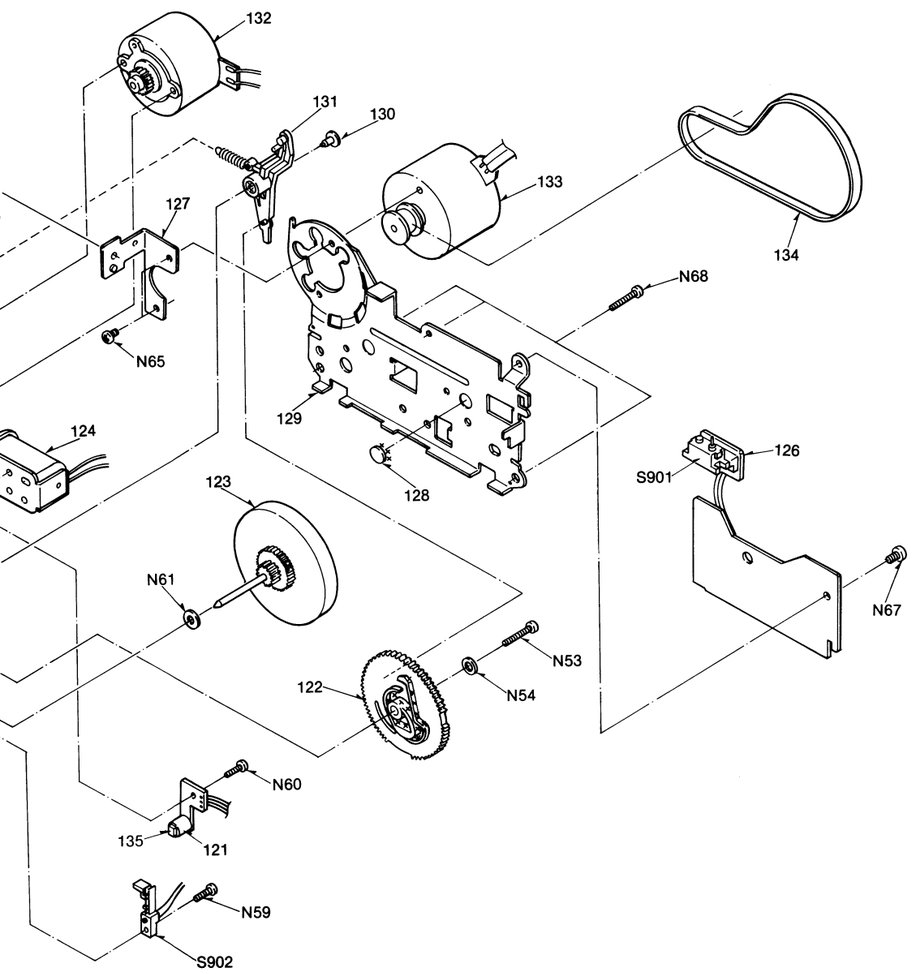
Notes:

- When changing mechanism parts, apply the specified grease (RZZOL05) to the areas marked "xx" shown in the drawing "Mechanical Parts Location".



REPLACEMENT PARTS LIST

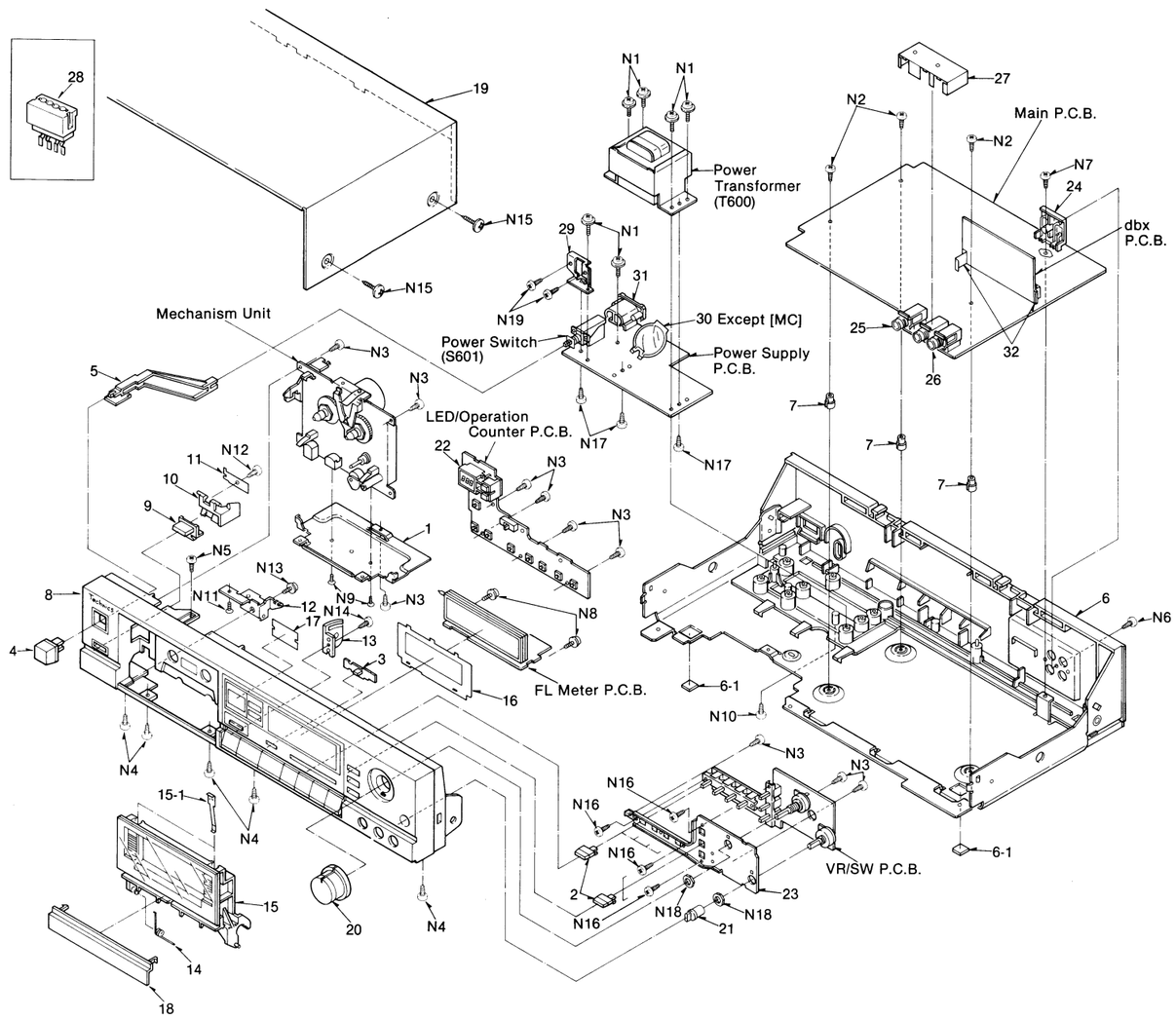
Ref. No.	Part No.	Part Name & Description	
MECHANISM PARTS			
101	SJH99	R.P Head	(1)
102	SJH100	E Head	(1)
103	SMQA1001	Head Spring	(2)
104	SMQA1002	Head Spacer	(1)
105	SMQA1003	Head Base	(1)
106	SMQA1004	Head Base Spring	(1)
107	SMQA1005	Pinch Roller Arm Ass'y	(1)
108	SMQA1006	Pinch Roller Spring (R)	(1)
109	SMQA1026	Take Up Reel Ass'y	(1)
110	SMQA1013	Supply Reel Ass'y	(1)
111	SMQA1011	Eject Stopper Arm	(1)
112	SMQA1012	Stopper Spring	(1)
113	SMQA1015	Hold Lever	(1)
114	SMQA1009	Spacer	(1)
115	SMQA1008	Chassis Ass'y	(1)
116	SMQA1025	Rec Safety Lever	(1)
117	SMQA1016	Idoler Ass'y	(1)
118	SMQA1024	Hold Spring	(1)
119	SMQA1019	Lever Spring	(1)
120	SMQA1018	Eject Arm	(1)
121	SMQA1022	Spacer	(1)
122	SMQA1033	Cam Gear (B)	(1)
123	SMQA1032	Flywheel Ass'y	(1)
124	SMQA1030	Plunger	(1)
125	SMQA1027	Pack Hold Spring	(1)
126	SMQA1021	Spacer	(1)
127	SMQA1020	Angle	(1)
128	SMQA1034	Spacer	(1)
129	SMQA1035	Flywheel Bracket (B)	(1)
130	SMQA1029	Cap	(1)
131	SMQA1028	Play Arm Ass'y	(1)
132	SMQA1036	Motor Ass'y (Reel)	(1)
133	SMQA1037	Motor Ass'y (Main)	(1)
134	SMQA1038	Main Belt	(1)
135	SMQA1041	Photo Senser	(1)
SCREWS and WASHERS			
N51	XSN2+8	Screw ⊕2×	
N53	XTN2+13C	Screw ⊕2×	
N54	XWE2	Washer 2ø	
N55	SMQA1010	Polyslider W	
N56	XTN3+8C	Screw ⊕3×	
N57	SMQA1007	Nylon Wash	
N58	SMQA1014	Polyslider W	
N59	XTN2+7C	Screw ⊕2×	
N60	XTN2+6C	Screw ⊕2×	
N61	SMQA1031	Polyslider W	
N62	XYN26+C3	Screw ⊕2.6	



Part Name & Description	
ack Hold Spring	(1)
pacer	(1)
ngle	(1)
pacer	(1)
lywheel Bracket (B)	(1)
ap	(1)
lay Arm Ass'y	(1)
lotor Ass'y (Reel)	(1)
lotor Ass'y (Main)	(1)
lain Belt	(1)
hoto Senser	(1)

Ref. No.	Part No.	Part Name & Description	
SCREWS and WASHERS			
N51	XSN2 + 8	Screw ⊕2 × 8	(4)
N53	XTN2 + 13C	Screw ⊕2 × 13	(2)
N54	XWE2	Washer 2φ	(2)
N55	SMQA1010	Polyslider Washer	(2)
N56	XTN3 + 8C	Screw ⊕3 × 8	(1)
N57	SMQA1007	Nylon Washer	(1)
N58	SMQA1014	Polyslider Washer	(2)
N59	XTN2 + 7C	Screw ⊕2 × 7	(1)
N60	XTN2 + 6C	Screw ⊕2 × 6	(1)
N61	SMQA1031	Polyslider Washer	(1)
N62	XYN26 + C3	Screw ⊕2.6 × 3	(1)
N63	XYN26 + C6	Screw ⊕2.6 × 6	(2)
N64	SMQA1017	Color Screw	(1)
N65	XYN26 + C45	Screw ⊕2.6 × 4.5	(2)
N66	XTN3 + 4F	Screw ⊕3 × 4	(1)
N67	XTN3 + 5F	Screw ⊕3 × 5	(1)
N68	XTN26 + 8C	Screw ⊕2.6 × 8	(3)

■ CABINET PARTS LOCATION



REPLACEMENT PARTS LIST

Notes:

- Part numbers are indicated on most mechanical parts. Please use this part number for parts order.
- Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
- Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.
- Ⓚ-marked Parts are used for silver type only. ○-marked Parts are used for black type only. Part other than ○ and Ⓚ-marked are used for both black and silver type.
- The parenthesized numbers in the column of description stand for the quantity per set.

Ref. No.	Part No.	Description	
CABINET & CHASSIS PARTS			
1	SMN2012	Angle	(1)
2 Ⓚ	SBC799	Button	(7)
2 ○	SBC799 – 1	Button	(3)
3	SBD133	Knob	(1)
4 Ⓚ	SBC666 – 3	Button	(1)
4 ○	SBC666	Button	(1)
5	SUB258	Connection Rod	(1)
6 [EG, EH]	SYKSB405 – KG	Chassis Ass'y	(1)
6 [XL, XA, XB]	SYKSB405 – KL	Chassis Ass'y	(1)
6 [MC]	SYKSB405 – KC	Chassis Ass'y	(1)
[6-1	[SKL293	Foot	(4)
7	SHE185	Spacer	(3)
8 Ⓚ	SGYSB405 – KE	Front Panel Ass'y	(1)
8 ○	SGYSB405 – SE	Front Panel Ass'y	(1)
9 Ⓚ	SBC736 – 1	Button	(1)
9 ○	SBC736	Button	(1)
10	SUB236 – 2	Rod	(1)
11	SMN1971	Angle	(1)
12	SMN2011	Angle	(1)
13	SKJSB405 – KE	Damper Gear Ass'y	(1)

Ref. No.	Part No.	Description	
14	SUS820	Spring	(1)
15	SGXSB405 – KE	Cassette Holder Ass'y	(1)
[15-1	[QBP2006A	Spring	(2)
16	SDU303 – 1	Filter	(1)
17	SDU304	LCD Filter	(1)
18 Ⓚ	SGX7843 – 1	Ornament	(1)
18 ○	SGX7843 – 3	Ornament	(1)
19 Ⓚ	SKC1970K99	Cabinet	(1)
19 ○	SKC1970S98	Cabinet	(1)
20 Ⓚ	SBN1211	Knob, Volume	(1)
20 ○	SBN1211 – 1	Knob, Volume	(1)
21 Ⓚ	SBN1205	Knob, Balance	(1)
21 ○	SBN1205 – 1	Knob, Balance	(1)
22	SHR9801	Bracket	(1)
23	SMN2010	Angle	(1)
24	SJF3057N	Terminal Board	(1)
25	SJJ126B	Jack	(1)
26	SJJ127HH	Jack	(1)
27	SMN1970 – 1	Angle	(1)
28	SJT30643 – V	Socket, J [C]	(1)
28	SJT30743 – V	Socket, J [A] [B]	(2)
29	SMN1983	Angle	(1)
30 except [MC]	SMX888	Shield Parts	(1)
31 ⚠ [XL] only	SJS9237	AC Inlet	(1)
31 ⚠ [other]	SJS9236	AC Inlet	(1)
32	SMN1978	P.B. Holder	(2)
SCREWS, NUTS & WASHERS			
N1	XTW3 + 12QFR	Tapping, ⊕3 × 12	(6)
N2	XTB3 + 14J	Tapping, ⊕3 × 14	(3)
N3	XTV3 + 10JFR	Tapping, ⊕3 × 10	(9)
N4	XTB3 + 8J	Tapping, ⊕3 × 8	(6)
N5	XTB3 + 6FFR	Tapping, ⊕3 × 6	(1)
N6	XTB3 + 12JFZ	Tapping, ⊕3 × 12	(1)
N7	XTBS3 + 8JFZ1	Tapping, ⊕3 × 8	(1)
N8	XTWS3 + 10QFR	Tapping, ⊕3 × 10	(2)
N9	XTS3 + 8FFR	Tapping, ⊕3 × 8	(2)
N10	XTB3 + 10GFZ	Tapping, ⊕3 × 10	(1)
N11	XTS3 + 10J	Tapping, ⊕3 × 10	(1)
N12	XTB26 + 8J	Tapping, ⊕26 × 8	(1)
N13	XTW3 + 10T	Tapping, ⊕3 × 10	(1)
N14	XTB3 + 12J	Tapping, ⊕3 × 12	(1)
N15 Ⓚ	SNE2125 – 1	Cabinet	(4)
N15 ○	SNE2125	Cabinet	(4)
N16	XTN3 + 6FFR	Tapping, ⊕3 × 6	(4)
N17	XTV3 + 6JFZ	Tapping, ⊕3 × 6	(3)
N18	XNS8	Nut	(2)
N19	XYN3 + C6	Tapping, ⊕3 × 6	(2)
ACCESSORIES			
A1 [XL, XA, EH]	SQF12728	Instruction Book	(1)
A1 [EG]	SQF12730	Instruction Book	(1)
A1 [MC]	SQF12755	Instruction Book	(1)
A1 [XB]	SQF12826	Instruction Book	(1)
A2 ⚠ [EG, XA, EH]	SJA171	Power Cord	(1)
A2 [XL] ⚠	SJA173	Power Cord	(1)
A2 [MC] ⚠	SJA170	Power Cord	(1)
A2 [XB] ⚠	SJA183	Power Cord	(1)
A3 ⚠ [XA] only	SJP5213 – 1	Plug	(1)
A3 ⚠ [XB] only	SJP9215	Plug	(1)
A4	SJP2264	Connection Cable	(1)
PACKINGS			
P1 Ⓚ	SPG5593	Carton Box	(1)
P1 ○	SPG5594	Carton Box	(1)
P2	SPS4708	Pad, Left Side	(1)
P3	SPS4709	Pad, Right Side	(1)
P4	SPS4756	Spacer	(1)
P5	XZB50X65A02	Polyethylene Sheet	(1)

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860703100 Ⓗ AH. TN. KK

ORDER NO. HAD8604482C0-A

dbx/Dolby B·C NR-Equipped Stereo Cassette Deck

RS-B405

DEUTSCH

■ MESSUNGEN UND EINSTELL METHODEN

Meßinstrumente

- Elektronisches Voltmeter (EVM)
- Oszilloskop
- Digitaler Frequenzmesser
- Audiofrequenz-Oszillator
- Dämpfungswiderstand
- Gleichstrom-Voltmeter
- Widerstand (600Ω)

Kopfazimut-Justierung

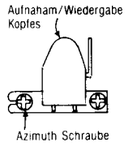

Abb. 2

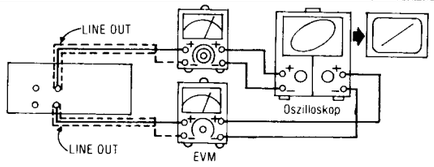

Abb. 1

1. Die Anschlußverbindungen für die Testgeräte sind in Abb. 1 gezeigt.
2. Den Azimut-Justierungsteil (8kHz, −20dB) des Testbandes (QZZCFM) wiedergeben und die Winkeljustierungs-Einstellschraube so verstellen, daß der Ausgang vom linken und rechten Kanal maximal wird. (Wenn die Justierpositionen für den linken und rechten Kanal verschieden sind, ist eine Position zu finden, wo der Ausgang des linken und rechten Kanals ausgelichen ist, und dann ist die Justierung durchzuführen.)
3. Gleichzeitig eine Lissajous-Wellenform ziehen und Phasenablenkung eliminieren.
4. Nach erfolgter Justierung sind die Bandführungs-Höhen-und-Winkeljustierschrauben zu sichern.

Bandgeschwindigkeits-Justierung

1. Der Testaufbau ist in Abb. 3 gezeigt.
2. Den mittleren Teil des Testbandes (QZZCWAT) wiedergeben.
3. Den Drehwiderstand im Motor so justieren. daß die Ausgangsleistung dem Standard-Wert entspricht.

Standard-Wert: 3000±20Hz

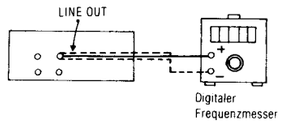

Abb. 3

Wiedergabe-Frequenzgang

1. Der Testaufbau ist in Abb. 4 gezeigt.
2. Den Wiedergabe-Frequenzgangteil (315Hz, 12,5kHz~63Hz, −20dB) des Testbandes (QZZCFM) wiedergeben.
3. Überprüfen, ob der Frequenzgang innerhalb des in Abb. 5 für den linken und rechten Kanal gezeigten Bereichs liegt.

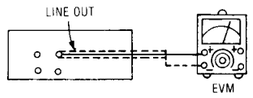

Abb. 4

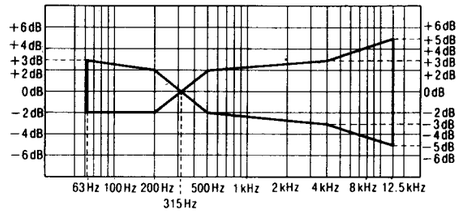

Abb. 5

Justierung des Wiedergabe-Verstärkungsgrades

1. Der Testaufbau ist in Abb. 4 gezeigt.
2. Den für den Wiedergabe-Verstärkungsgrad justierten Teil (315Hz, 0dB) des Testbandes (QZZCFM) wiedergeben.
3. Den Drehwiderstand 5, (linker Kanal) {Drehwiderstand 6 (rechter Kanal)} so justieren, daß die Ausgangsleistung dem Standard-Wert entspricht.

Standard-Wert: 0,4V±0,5dB (0,02V)

Löschstrom-Justierung

1. Der Testaufbau ist in Abb. 6 gezeigt.
2. Den Bandsorten-Wahlschalter in die "metal"-Position einstellen.
3. Eine Reineisenband-Cassette einsetzen.
4. Die Aufnahmetaste und die Pausentaste drücken.
5. Dabei ist zu überprüfen, ob die Ausgangsleistung zwischen Testpunkt 301 und Masse dem Standard-Wert entspricht.
6. Testpunkt 302 abtrennen, falls der Wert mehr als 240mA ist.

Standard-Wert: 210±30mA (Metal), (210±30mV)

$$\text{Löschstrom (A)} = \frac{\text{Spannung über Widerstand R301}}{1\,(\Omega)}$$

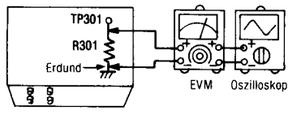

Abb. 6

Gesamtfrequenzgang

1. Der Testaufbau ist in Abb. 7 gezeigt.
2. Den Bandsorten-Wahlschalter in die "Normal"-Position einstellen.
3. Eine Normalband-Leercassette (QZZCRA) einsetzen und aufnehmen, während ein Signal von nacheinander 50Hz, 100Hz, 200Hz, 500Hz, 1kHz, 4kHz, 8kHz, 10kHz und 12,5kHz bei 20dB, abgeschwächt vom Referenz-Eingangspegelsignal (1kHz, −24dB) eingegeben wird.

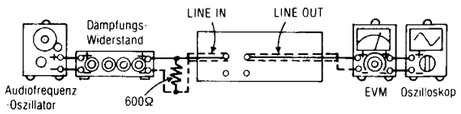

Abb. 7

4. Das in Schritt 3 aufgezeichnete Signal wiedergeben und prüfen, ob der Pegel jeder Ausgangsfrequenz im Bereich liegt, der in Abb. 8 im Vergleich zur Referenzfrequenz (1kHz) gezeigt wird.
5. Falls er nicht im Standard-Bereich liegt, ist der Vormagnetisierungs-strom mit Drehwiderstand 301 (linker Kanal) {Drehwiderstand 302 (rechter Kanal)} so zu justieren, daß der Frequenzpegel innerhalb des Standards zu liegen kommt.
   - Erhöhter Pegel im Frequenzbereich.....Den Vormagnetisierungsstrom erhöhen.
   - Reduzierter Pegel im Frequenzbereich.....Den Vormagnetisierungsstrom senken.
6. Anschließend das auf der CrO_2-Leerband-Cassette (QZZCRX) und der Reineisenband-Leercassette (QZZCRZ) aufgezeichnete Signal auf 14kHz erhöhen und auf gleiche Weise justieren, wie vorgehend beschrieben. Dann überprüfen, ob der Frequenzpegel innerhalb des in Abb. 9 gezeigten Bereichs liegt.

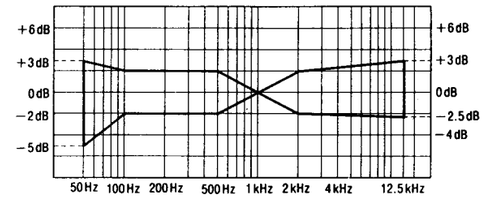

Abb. 8

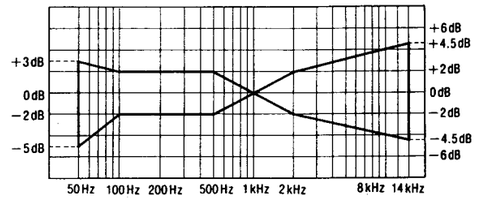

Abb. 9

Justierung des Gesamtverstärkungsgrades

1. Der Testaufbau ist in Abb. 7 gezeigt.
2. Den Bandsorten-Wahlschalter in die "Normal"-Position einstellen.
3. Eine Normalband-Leercassette (QZZCRA) einsetzen und im Aufnahmepause-Zustand des Gerätes das Referenzsignal (1kHz, −24dB) eingeben.
4. Die Ausgangsleistung mit dem Dämpfungswiderstand auf 0,42V justieren und dann aufnehmen.
5. Das in Schritt 3 aufgezeichnete Signal wiedergeben und überprüfen, ob die Ausgangsleistung dem Standard-Wert entspricht.
6. Falls sie nicht dem Standard-Wert entspricht, ist der Drehwiderstand 101 (linker Kanal) {Drehwiderstand 102 (rechter Kanal)} zu justieren, und dann sind die Schritte (2), (3) und (4) zu wiederholen, bis die Ausgangsleistung dem Standard-Wert entspricht.

Standard-Wert; 0,4V±0,05V

Justierung des Fluoreszenzmeters

1. Der Testaufbau ist in Abb. 7 gezeigt.
2. Eine Normal band-Leercassette (QZZCRA) einsetzen und im Aufnahmepause-Zustand des Gerätes das Referenz-Eingangspegelsignal (1kHz, −24dB) eingeben.
3. Die Ausgangsleistung mit dem Dämpfungswiderstand auf 0,4V justieren.

— −40dB-Justierung —

4. Pegelsignal von 40dB, das vom Eingang in Schritt 2 abgeschwächt ist, eingeben.
5. Den Drehwiderstand 401 so justieren, daß der −40dB-Segmentteil halb beleuchtet ist. (Siehe Abb. 10)

Abb. 10

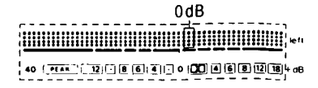

Abb. 11

— 0dB-Justierung —

6. Den Drehwiderstand 701 so justieren, daß der 0dB-Segmentteil halb beleuchtet ist, wenn der Eingang von Schritt 2 eingegeben wird (Siehe Abb. 11).
7. Die obigen Schritte (2), (3), (4), (5) und wiederholen und prüfen, ob die −40dB-und 0dB-segmentteile halb beleuchtet sind.

FRANÇAIS

Dolby-Rauschunterdrückungs-Schaltkreis

1. Der Testaufbau ist in Abb 12 gezeigt.
2. Eine Normalband-Cassette einsetzen und im Aufnahmepause-Zustand des Gerätes ein 5kHz-Signal eingeben.
3. Mit dem Dämpfungswiderstand so justieren, daß die Ausgangsleistung zwischen Anschluß ⑦ des IC401 (linker kanal) {IC402 (rechter Kanal)} und Masse 12.3mV beträgt.

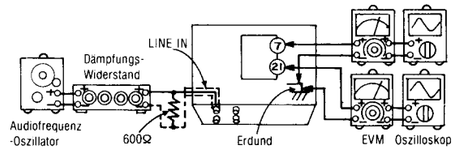

Abb. 12

— Dolby-B (Kodierungseigenschaft) —

4. Den Rauschunterdrückungs-Schaltkreis (NR) auf "Dolby B" einstellen und das Eingangssignal auf 1kHz, 5kHz verändern.
5. Überprüfen, ob die Ausgangsleistung zwischen Anschluß ㉑ des IC401 (linker Kanal) {IC402 (rechter Kanal)} und Masse wie vorgeschrieben gegenüber dem Pegel im rauschunterdrückungsfreiem Zustand verändert wird.

Standard-Wert: 6±2,5dB (1kHz), 8±2,5dB (5kHz)

— Dolby-C (Kodierungseigenschaft) —

6. Den Rauschunterdrückungs-Schalter (NR) auf "Dolby C" einstellen und das Eingangssignal auf 1kHz, 5kHz verändern.
7. Überprüfen, ob die Ausgangsleistung zwischen Anschluß ㉑ des IC401 (linker Kanal) {IC402 (rechter Kanal)} und Masse wie vorgeschrieben gegenüber dem Pegel im rauschunterdrückungsfreiem Zustand verändert wird.

Standard-Wert: 11,5±2,5dB (1kHz), 8,5±2,5dB (5kHz)

Justierung der dbx-Ausschlag-Rückfallzeit

1. Der Testaufbau ist in Abb. 13 gezeigt.
2. Eine Normalband-Cassette einlegen und den Rauschunterdrückungs-Schalter (NR) auf "dbx" einstellen.
3. Ein Signal von 1kHz, −27dB im Aufnahmepause-Zustand des Gerätes eingeben.
4. Mit dem Dämpfungswiderstand so justieren, daß die Ausgangsleistung zwischen C525 (linker Kanal) {C526 (rechter Kanal)} und Masse 300mV beträgt.
5. Den Drehwiderstand 501 so justieren, daß die Anzeige des Gleichstrom-Voltmeters dem Referenz-Wert entspricht.

Referenz-Wert: 16±0,5mV

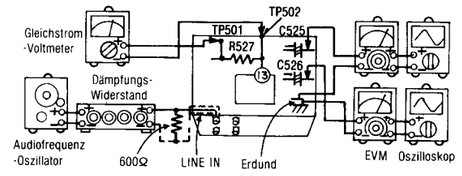

Abb. 13

FRANÇAIS

■ METHODES DES MEASURES ET REGLAGES

Appareils de mesurage

- Voltmètre électronique
- Oscilloscope
- Compteur de fréquence numérique
- Oscillateur de fréquence audio
- A.T.T. (Atténuateur)
- Voltmètre à C.C.
- Résistance (600Ω)

Réglage de l'angle des têtes de lecture

1. Le raccordement de l'équipement d'essai est montré à la Fig. 1.
2. Faire jouer la partie réglée azimutale (8kHz, −20dB) de la bande d'essai (QZZCFM) et. régler la vis de mise au point azimutale de telle sorte que les puissances de sortie du canal de gauche et du canal de droite soient au maximum.
   (Si les positions de réglage du canal de gauche et du canal de droite sont différentes, trouver une position où les puissances de sortie des canaux de gauche et de droite soient équilibrées, puis effectuer la mise au point.)
3. En même temps, établir une forme d'onde de Lissajous et éliminer la déviation de phase.
4. Après le réglage, bloquer les vis du réglage angulaire et de la hauteur des guides de bande.

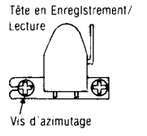

Fig. 2

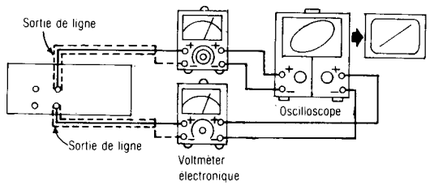

Fig. 1

Réglage de la vitesse de défilement de la bande

1. Le raccordement de l'equipement d'essai est montré à la Fig. 3.
2. Faire jouer la partie centrale de la bande d'essai (QZZCWAT).
3. Régler VR dans le moteur de telle sorte que la puissance de sortie soit en deçà de la normale.

Valeur normalisée: 3000±20Hz

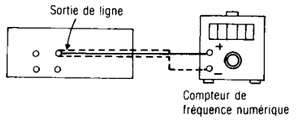

Fig. 3

Réponse en fréquence de la lecture

1. Le raccordement de l'équipment d'essai est montré à la Fig. 4.
2. Faire jouer la partie de la réponse en fréquence de la lecture (315Hz, 12,5kHz~63Hz, −20dB) de la bande d'essai (QZZCFM).
3. Vérifier que la fréquence soit en deçà de la plage montrée à la Fig. 5, à la fois pour le canal de gauche et le canal de droite.

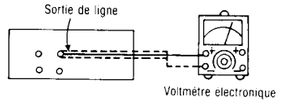

Fig. 4

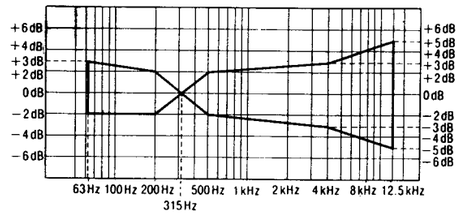

Fig. 5

Réglage d'amplification de la lecture

1. Le raccordement de l'équipement d'essai est montré à la Fig. 4.
2. Faire jouer la partie réglée d'amplification de la lecture (315Hz, 0dB) de la bande d'essai (QZZCFM).
3. Régler VR5 (canal de gauche) [VR6 (canal de droite)] de telle sorte que la puissance de sortie soit en deçà de la normale.

Valeur normalisée: 0,4±0,5dB (0,02V)

Réglage de la tension d'effacement

1. Le raccordement de l'équipement d'essai est montré à la Fig. 6.
2. Régler le commutateur sélecteur de bande sur la position "metal".
3. Introduire la bande métallisée.
4. Appuyer sur les touches d'enregistrement et d'intermission.
5. A ce moment, s'assurer que la puissance de sortie entre TP301 et la masse soit en deçà de la normale.
6. Déconnecter TP302 si la valeur est plus supérieur que 240mA.

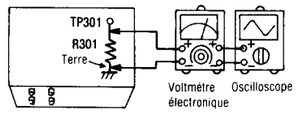

Fig. 6

Valeur normalisée: 210±30mA (Métallisée) (210±30mV)

$$\text{Courant d'effacement} = \frac{\text{Tension à travers la résistance R301}}{1\,(\Omega)}$$

Réponse en fréquence globale

1. Le raccordement de l'équipement d'essai est montré à la Fig. 7.
2. Régler le commutateur sélecteur de bande sur la position normale.
3. Installer une bande vierge normale (QZZCRA) et enregistrer en appliquant un signal (50Hz, 100Hz, 200Hz, 500Hz, 1kHz, 4kHz, 8kHz, 10kHz et 12,5kHz) de 20dB atténués provenant du signal du niveau d'entrée, de référence (1kHz, −24dB).

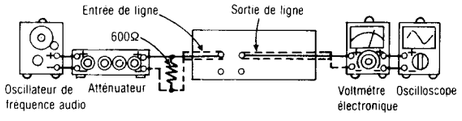

Fig. 7

4. Faire jouer le signal enregistré à l'étape 3 et vérifier que le niveau de chaque fréquence de sortie soit en deçà de la plage montrée la Fig. 8 en comparaison avec la fréquence de référence (1kHz).
5. S'il n'est pas en deçà de la plage standard, régler le courant de polarisation avec VR301 (canal de gauche) [VR302 (canal de droite)], de telle sorte que le niveau de fréquence soit en deçà de la normale.
   - Niveau vers la haut dans la plage de fréquence élevée..... Augmenter le courant de polarisation.
   - Niveau vers le bas dans la plage de fréquence élevée..... Diminuer le courant de polarisation.
6. Après cela, amplifier le signal enregistré sur la bande vierge CrO_2 (QZZCRX) et la bande vierge métallisée (QZZCRZ) jusqu'à 14kHz et régler de la même manière que celle mentionnée ci-dessus. Puis, vérifier que le niveau de fréquence soit en deçà de la plage montrée à la Fig. 9.

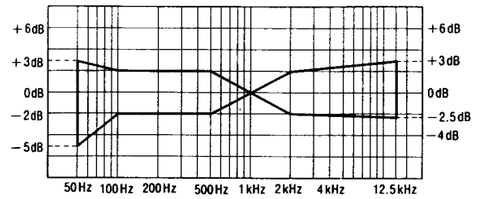

Fig. 8

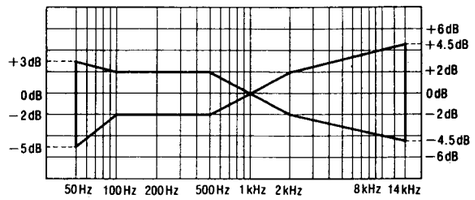

Fig. 9

Réglage d'amplification globale

1. Le raccordement de l'équipement d'essai est montré à la Fig. 7.
2. Régler le commutateur sélecteur de bande sur la position normale.
3. Installer une bande vierge normale (QZZCRA) et appliquer le signal de niveau d'entrée de référence (1 kHz, −24 dB) sur le mode d'intermission d'enregistrement.
4. Régler la puissance de sortie 0,42 V avec l'atténuateur, puis enregistrer.
5. Faire jouer le signal enregistré à l'étape 3 et vérifier que la puissance de sortie soit en deçà de la normale.
6. Si elle n'est pas en deçà de la normale, régler VR101 (canal de gauche) [VR102 (canal de droite)] et répéter les étapes (2), (3) et (4) jusqu'à ce que la puissance de sortie soit en deçà de la normale.

Valeur normalisee: 0,4±0,05 V

Réglage du compteur fluorescent

1. Le raccordement de l'équipement d'essai est montré à la Fig. 7.
2. Installer une bande vierge normale (QZZCRA) et appliquer le signal du niveau d'entrée de référence (1 kHz, −24 dB) sur le mode d'intermission d'enregistrement.
3. Régler la puissance de sortie sur 0,4 V avec l'atténuateur.

— Réglage de −40 dB —

4. Appliquer un signal de niveau de 40 dB atténués à partir de l'entrée de l'étape 2.
5. Régler VR401 de telle sorte que la partie segmentée de −40 dB soit á moitié éclairée. (Voir la Fig. 10.)

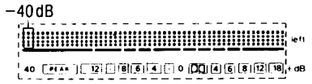

Fig. 10

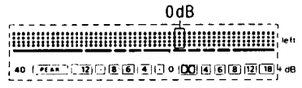

Fig. 11

— Réglage de 0 dB —

6. Régler VR701 de telle sorte que la partie segmentée de 0 dB soit à moitié éclairée lorsque l'entrée de l'étape 2 est appliquée.
7. Répéter les tétapes (2), (3), (4), (5) et (6) et vérifier que les deux parties segmentées de −40 dB et de 0 dB soient à moitié éclairées.

Circuit de réduction des bruits Dolby

1. Le raccordement de L'équipement d'essai est montré à la Fig. 12.
2. Installer une bande normale et appliquer un signal de 5 kHz sur le mode d'intermission d'enregistrement.
3. Régler avec l'atténuateur de telle sorte que la puissance de sortie entre la borne ⑦ de IC401 (canal de gauche) [IC402 (canal de droite)] et la masse soit de 12,3 mV.

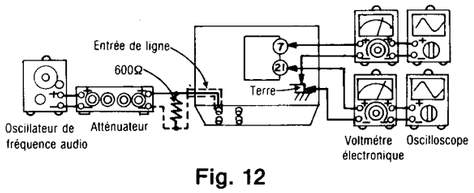

Fig. 12

— Dolby B (Caractéristiques de codage) —

4. Régler le commutateur de réduction des bruits sur "Dolby B" et changer le signal d'entrée sur 1 kHz, 5 kHz.
5. Vérifier que la puissance de sortie entre la borne 21 de IC401 (canal de gauche) [IC402 (canal de droite)] et la masse change tel qu'il est spécifié à partir du niveau d'entrée sur le mode de sortie de réduction des bruits.

Valeur normalisée: 6±2,5 dB (1 kHz), 8±2,5 dB (5 kHz)

— Dolby C (Caractéristiques de codage) —

6. Régler le commutateur de réduction des bruits sur "Dolby C" et changer le signal d'entrée sur 1 kHz, 5 kHz.
7. Vérifier que la puissance de sortie entre la borne 21 de IC401 (canal de gauche) [IC402 (canal de droite)] et la masse change tel qu'il est spécifié à partir du niveau d'entrée sur le mode de sortie de réduction des bruits.

Valeur normalisée: 11,5±2,5 dB (1 kHz), 8,5±2,5 dB (5 kHz)

Réglage de la durée de rétablissement d'attaque dbx

1. Le raccordement de l'équipement d'essai est montré à la Fig. 13.
2. Installer une bande normale et régler le commutateur de réduction des bruits sur "dbx".
3. Appliquer un signal de 1 kHz, −24 dB sur le mode de pause d'enregistrement.
4. Régler avec l'atteénuateur de telle sorte que la puissance de sortie entre C525 (canal de gauche) {C526 (canal de droite)} et la masse soit de 300 mV.
5. Régler VR501, de telle sorte que la lecture du voltmètre à C.C. soit en deçà de la référence.

Valeur de référence: 16±0,5 mV

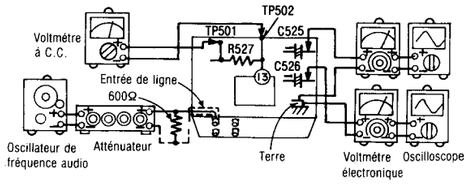

Fig. 13

ESPAÑOL

■ METODOS DE AJUSTE Y MEDIDA

Instrumento de medición

- EVM (Voltimetro electrónico)
- Osciloscopio
- Frecuencimetro digital
- Oscilador AF
- ATT (Atenuador)
- Voltimetro CC
- Resistor (600Ω)

Ajuste acimutal de cabeza

1. La conexión del equipo de prueba se muestra en la Fig. 1.
2. Reproducir la parte ajustada de acimut (8 kHz, −20 dB) de la cinta de prueba (QZZCFM) y regular el tornillo de ajuste de ángulo de manera que las salidas de CH-I y CH-D sean maximizadas.
   (Cuando las posiciones de ajuste sean diferentes de CH-I y CH-D, encontrar una posición donde las salidas de CH-I y CH-D estén equilibradas y, luego, hacer el ajuste.)
3. Al mismo tiempo, trazar una forma de onda de Lissajous y eliminar la deflexión de fase.
4. Después del ajuste, fije los tornillos de ajuste de altura y ángulo de guía de cinta.

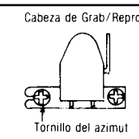

Fig. 2

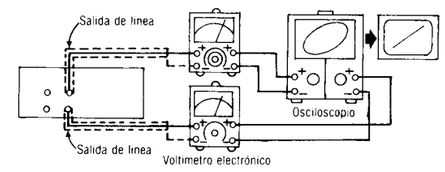

Fig. 1

Ajuste de velocidad de cinta

1. La conexión del equipo de prueba se muestra en la Fig. 3.
2. Reproducir la parte media de la cinta de prueba (QZZCWAT).
3. Ajustar el RV del motor de manera que la salida esté dentro de la estandard.

Valor estandard: 3000±20 Hz

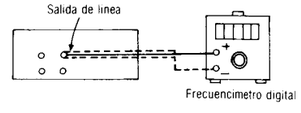

Fig. 3

Respuesta de frecuencia de reproducción

1. La conexión del equipo de prueba se muestra en la Fig. 4.
2. Reproducir la parte de respuesta de frecuencia de reproducción (315 Hz, 12,5 kHz — 63 Hz, −20 dB) de la cinta de prueba (QZZCFM).
3. Comprobar que la frecuencia esté dentro de la gama mostrada en la Fig. 5 tanto para CH-I como para CH-D.

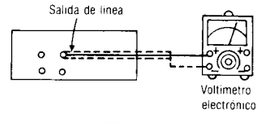

Fig. 4

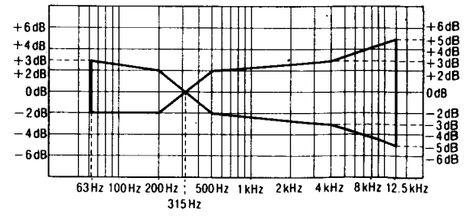

Fig. 5

Ajuste de ganancia de reproducción

1. La conexión del equipo de prueba se muestra en la Fig. 4.
2. Reproducir la parte ajustada de la ganancia de reproducción (315 Hz, 0 dB) de la cinta de prueba (QZZCFM).
3. Ajustar RV5 (CH-I) {RV6 (CH−D)} de manera que la salida esté dentro de la estandard.

Valor estandard: 0,4±0,5 dB (0,02 V)

Ajuste de corriente de borrado

1. La conexión del equipo de prueba se muestra en la Fig. 6.
2. Poner el interruptor selector de cinta en la posición "Metal".
3. Insertar la cinta metálica.
4. Apretar los botones de grabación y pausa.
5. En este momento, asegurarse de que la salida entre TP301 y tierra esté dentro de la estandard.
6. Interrumpir TP302 si el valor es superior que 240mA.

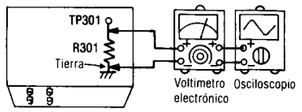

Fig. 6

Valor estandard: 210±30mA (Metal) (210±30mV)

$$\text{Corriente de borrado (A)} = \frac{\text{Voltaje a través de resistor R301}}{1\,(\Omega)}$$

Respuesta de frecuencia total

1. La conexión del equipo de prueba se muestra en la Fig. 7.
2. Poner el interruptor selector de cinta en la posición "normal".
3. Colocar una cinta virgen normal (QZZCRA) y grabar aplicando señal (50Hz, 100Hz, 200Hz, 500Hz, 1kHz, 4kHz, 8kHz, 10kHz y 12,5kHz), 20dB atenuada de la señal de nivel de entrada de referencia (1kHz, −24dB).

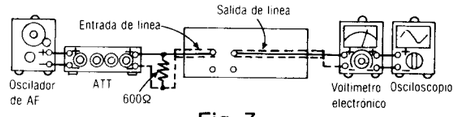

Fig. 7

4. Reproducir la señal grabada en el paso 3 y comprobar que el nivel de cada frecuencia de salida esté dentro de la gama mostrada en la Fig. 8. en comparación con la frecuencia de referencia (1kHz).
5. Si no está dentro de la gama estandard, ajustar la corriente de polarización mediante RV301 (CH-I) {RV302 (CH-D)} de manera que el nivel de frecuencia esté dentro del estandard.
   • Subir el nivel en la gama de alta frecuencia..... Incrementar la corriente de polarización.
   • Bajar el nivel en la gama de alta frecuencia..... Disminuir la corriente de polarización.
6. Después de eso, incrementar la señal grabada en la cinta virgen CrO_2 (QZZCRX) y la cinta virgen metálica (QZZCRZ) hasta 14kHz y ajustar de la misma manera como mencionado arriba y comprobar que el nivel de frecuencia esté dentro de la gama mostrada en la Fig. 9.

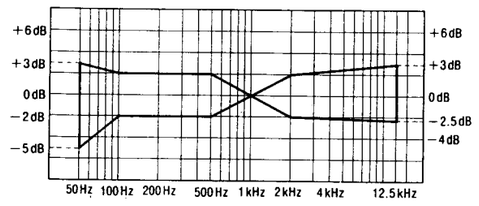

Fig. 8

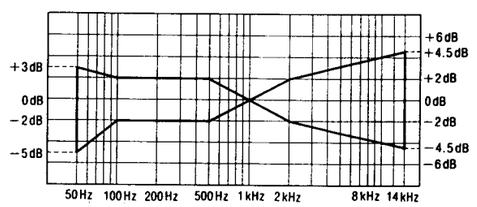

Fig. 9

Ajuste de ganancia total

1. La conexión del equipo de prueba se muestra en la Fig. 7.
2. Poner el interruptor selector de cinta en la posición "normal".
3. Colocar una cinta virgen normal (QZZCRA) y aplicar la senal de nivel de entrada de referencia (1kHz, −24dB) en la modalidad de pausa de grabación.
4. Ajustar la salida 0,42V mediante atenuador y, luego, grabar.
5. Reproducir la señal grabada en el paso 3 y comprobar que la salida esté dentro de la estandard.
6. Si no está dentro de la estandard, ajustar RV101 (CH-I) {RV102 (CH-D)} y repetir el paso (2), (3) y (4) hasta que la salida esté dentro de la estandard.

Valor estandard: 0,4V±0,05V

Ajuste de medidor fluorescente

1. La conexión del equipo de prueba se muestra en la Fig. 7.
2. Colocar una cinta virgen normal (QZZCRA) y aplicar la señal de nivel de entrada de referencia (1kHz, −24dB) en la modalidad de pausa de grabación.
3. Ajustar la salida a 0,4V mediante atenuador.

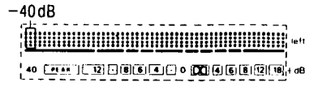

Fig. 10

— Ajuste de −40dB —

4. Aplicar señal de nivel 40dB atenuada por la entrada del paso 2.
5. Ajustar RV401 de manera que la parte de segmento −40dB esté medio iluminada. (Ver la Fig. 10.)

Fig. 11

— Ajuste de 0dB —

6. Ajustar RV701 de manera que la parte de segmento 0dB esté medio iluminada cuando se aplica la entrada del paso 2.
7. Repetir los pasos de arriba (2), (3), (4), (5) y (6) y comprobar que ambas partes de segmento −40dB y 0dB estén medio iluminadas.

Circuito RR Dolby

1. La conexión del equipo de prueba se muestra en la Fig. 12.
2. Colocar una cinta normal y aplicar señal 5kHz en la modalidad de pausa de grabación.
3. Ajustar mediante atenudador de manera que la salida entre terminal ⑦ de IC401 (CH-I) {IC402 (CH-D)} y tierra sea 12,3mV.

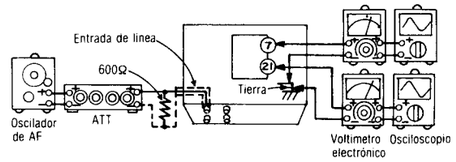

Fig. 12

— Dolby B (Codificar característica) —

4. Poner el interruptor RR en "Dolby B" y cambiar la señal de entrada a 1kHz, 5kHz.
5. Comprobar que la salida entre terminal ㉑ de IC401 (CH-I) {IC402 (CH-D)} y tierra cambie como especificado por el nivel en la modalidad de salida RR.

Valor estandard: 6±2,5dB (1kHz), 8±2,5dB (5kHz)

— Dolby C (Codificar característica) —

6. Poner el interruptor RR en "Dolby C" y cambiar la señal de entrada a 1kHz, 5kHz.
7. Comprobar que la salida entre terminal ㉑ de IC401 (CH-I) {IC402 (CH-D)} y tierra cambie como especificado por el nivel en la modalidad de salida RR.

Valor estandard: 11,5±2,5dB (1kHz), 8,5±2,5dB (5kHz)

Ajuste de tiempo de recuperación de ataque dbx

1. La conexión del equipo de prueba se muestra en la Fig. 13.
2. Poner una cinta normal y el interruptor RR on "dbx".
3. Aplicar señal de 1kHz, −27dB en la modalidad de pausa de grabación.
4. Ajustar mediante atenuador de manera que la salida entre C525 (CH-I) {C526 (CH-D)} y tierra sea 300mV.
5. Ajustar RV501 de manera que la lectura del voltímetro CC esté dentro de la referencia.

Valor de referencia: 16±0,5mV

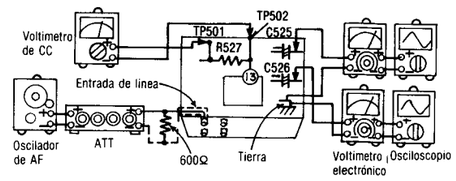

Fig. 13

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